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AIMS

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2. *To foster an appreciation and an understanding of the great buildings and architects of all historic cultures.*
3. *To encourage research in architectural history and to aid in disseminating the results of such research.*
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HERBERT HOFFMANN is a student of Professor George M. A. Hanfmann at Harvard. His tracing of altar types, running as far back as Third Dynasty Egypt, serves to remind us of the durability of ancient tradition as well as the capacity of the Hellenistic world to improvise. He is now in the Near East looking more deeply into these problems.

ANTECEDENTS OF THE GREAT ALTAR AT PERGAMON

An analysis of the architecture of the colossal altar of Zeus at Pergamon yields two outstanding structural components: the altar consists of a stepped square podium and an Ionic colonnade. The combination at Pergamon of these two elements inaugurates a new tradition of altar-building. Seen historically, the altar of Pergamon connotes the synthesis of two independent Eastern traditions, those of ground plan and of elevation (Figs. 1 and 2). One of these was from the beginning associated with altars; the other seems to have been more familiar to the Ionic grave monument, or *heroon*. We shall here attempt to trace briefly the history of each in order to understand better the significance of their association at Pergamon.

The oldest examples of monumental stepped square altars are far removed from Pergamon: the type was established in Egypt from remotest times. Here, such altars occur as early as the Third Dynasty, when two appear at Saqqarah (Fig. 3).[1] Better known is the well preserved chalkstone altar at Deir-el-bahri near Thebes, built by Hatshepsut to Re-Harmachis around 1500 B.C. (Fig. 4).[2] It is basically a variation on the same theme—colossal, square and stepped. Similar in construction are several somewhat later altars at nearby Tell-el-Amarna (Fig. 5), as well as numerous less refined imitations in Arabia, Phoenicia, and Palestine—notably Petra, where there are ten altars of this type, Elme-Esara, and Zibbcatuf, where the altar forms the core of the precinct.[3] Although not important in themselves, these altars show that the altar type was long established within the Syro-Phoenician cultural orbit. The importance of the altars at Deir-el-bahri and at Saqqarah lies in their central position as chief altars of a complex, and in the fact that both can be proven to have been accessible in Saite times (645-525 B.C.).

Amasis, who succeeded to the throne of Egypt in 568 B.C., was a famous Philhellene. He surrounded himself with a Greek bodyguard, fostered the Greek settlement at Naukratis, and formed close alliances with semi-Hellenized Lydia (whose king, Croesus, a loyal patron of Apollo at Delphi, is best remembered through his semi-legendary association with Solon), as well as the Greek city states of Samos, Miletus, and Cyrene. It is during the lifetime of Amasis that isolated altars of the Saqqarah-Deir-el-bahri type appear in Sardis,[4] Samos (Fig. 6),[5] Miletus (Fig. 7),[6] and Cyrene (Fig. 8).[7] These facts seem to be more than coincidental. They point to a strong emanation of influence from Egypt resulting in the establishment on Greek soil of an altar-type which soon came to be typically Ionian. Greeks could have seen the altar at Deir-el-bahri, for the excavators here found Saite ostraca in the ruins of the temple.[8] These ostraca and a copy of one of the temple's reliefs in the nearby Saite tomb of Ment-em-let prove beyond doubt that the temple was open in Saite times. At Saqqarah the evidence for the asumption that Greeks could have seen these altars is equally propitious. A relief of Zoser from the Third Dynasty complex is copied in a Saite relief at the Palace of Apries at Memphis (now at Copenhagen).[9] Even the gridmarks correspond.

Thus far, our argument has been largely negative; monumental stepped altars occur in Egypt before they do in Asia Minor. They do not occur in mainland Greece during the archaic period at all. A conclusion on the basis of these facts alone might be somewhat risky. It is when we come to Naukratis that the missing link is established. Here, in the temenos of Aphrodite, we find a monumental stepped altar which the excavators date to the first period of Greek colonization (Fig. 9).[10] This altar is prior to the reign of Amasis and thus antecedes any other Greek altar of its type. The vestigial Egyptian lateral ramps present at Naukratis disappear at Cyrene and Samos. The type spread rapidly in eastern Greece. Its origin was probably soon forgotten. The reason for the quick popularity of this raised monumental type altar on Ionian soil is readily explained: the sanctity of open-air cults was long-established in

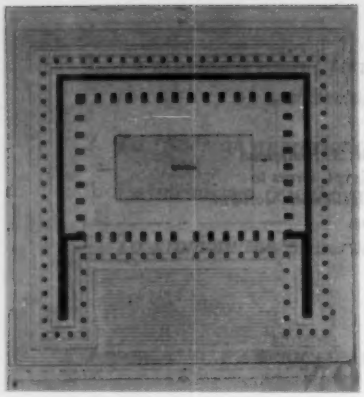


Fig. 1. Ground Plan, Great Altar, Pergamon. (*Altertümer von Pergamon*, III[1], pl. XV.)

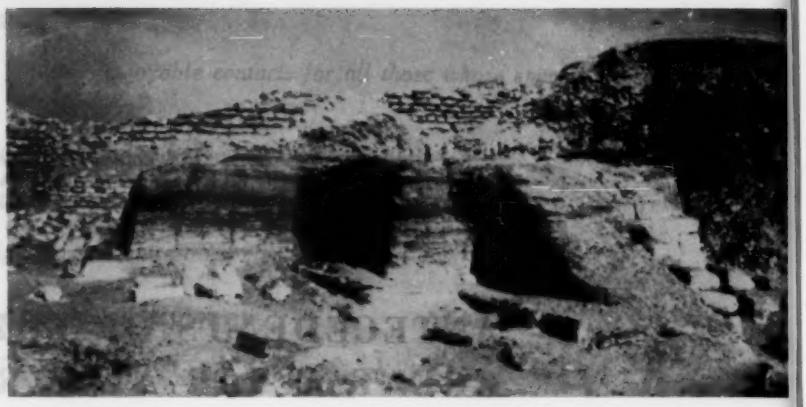


Fig. 3. Altar, Saqqarah. (Courtesy, Dr. Bernard V. Bothmer.)

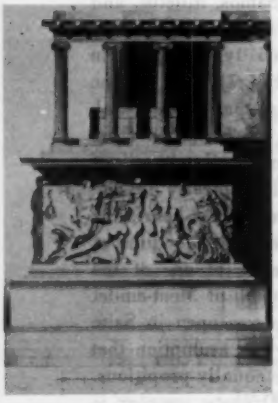


Fig. 2. Elevation, Great Altar, Pergamon. (*Altertümer von Pergamon*, III[1], pl. XIII.)

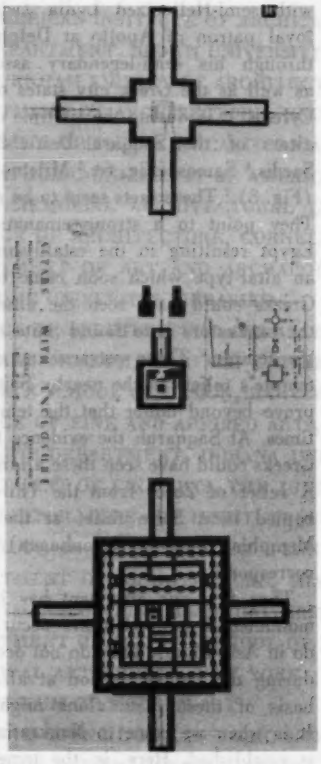


Fig. 5. Altars, Tell-el-Amarna.

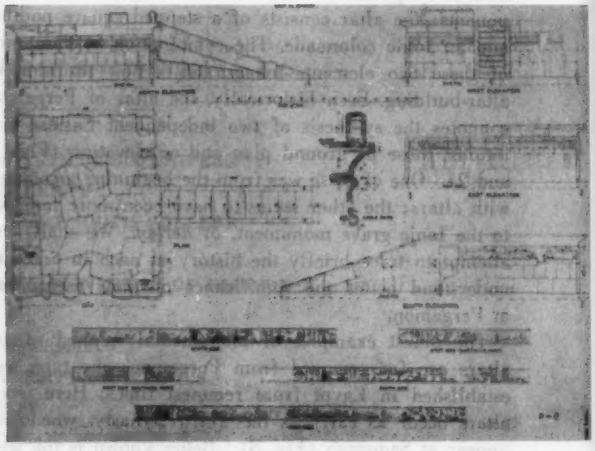


Fig. 4. Altar, Deir-el-bahri. (Naville, pl. VII.)

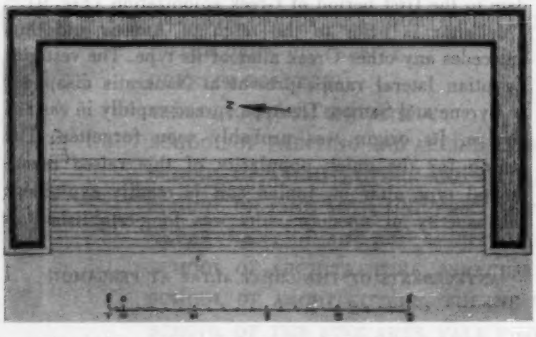


Fig. 6. Altar of Hera VII, Samos. (Schleif, Fig. 31.)

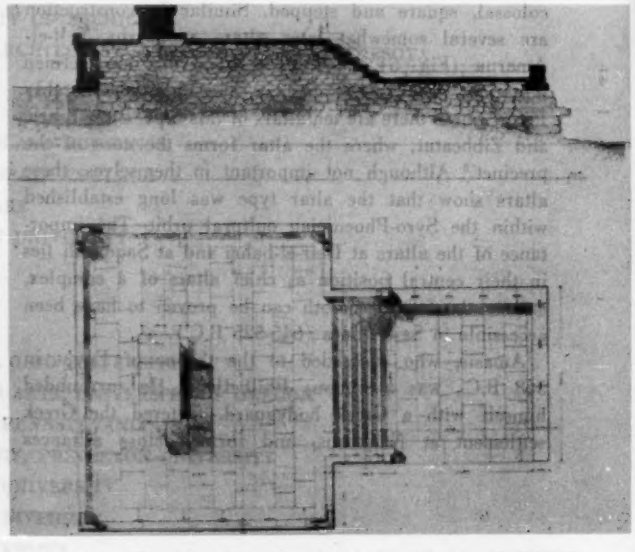


Fig. 7. Altar of Poseidon, Cape Monodendri. (Von Gerkan, pl. XXIV.)

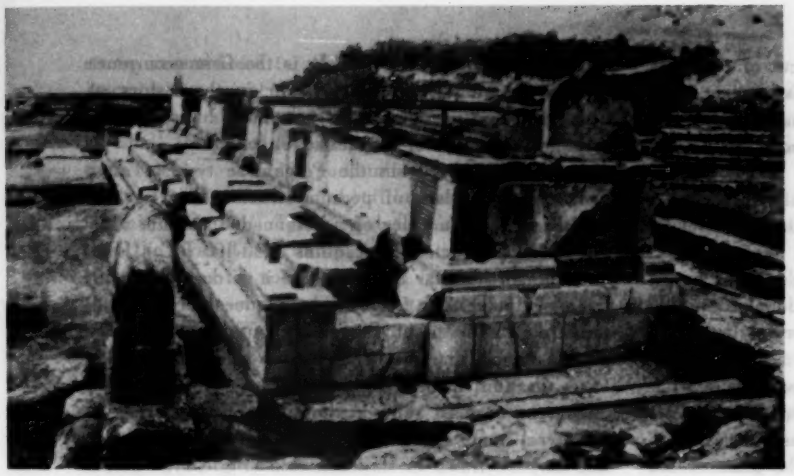


Fig. 8. Altar of Apollo, Cyrene. (*Africa Italiana* V, Fig. 24.)

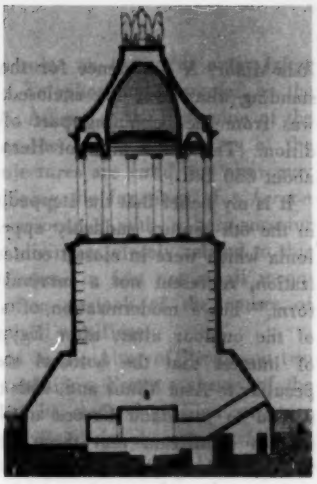


Fig. 12. Mausoleum of Halikarnassos. (F. Krischen, *Bonn Jahrb.*, CXXVIII, 1923, Fig. 5.)

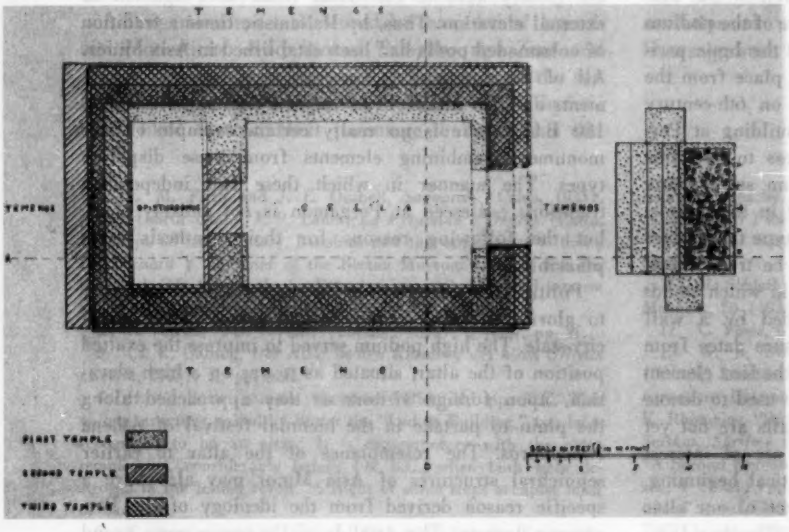


Fig. 9. Ground Plan Showing Altar, Temple of Aphrodite, Naukratis. (*Naukratis*, II, pl. II.)

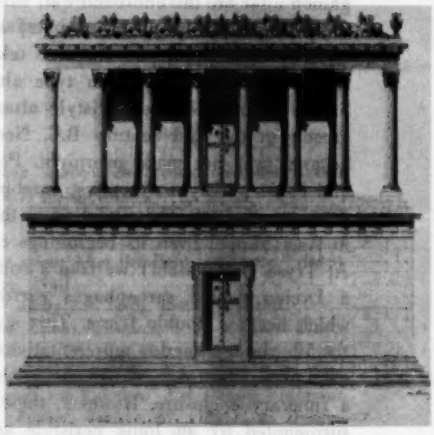


Fig. 13. Heroon at Belevi. (J. Keil, *JÖAI*, XXIX, Fig. 43.)

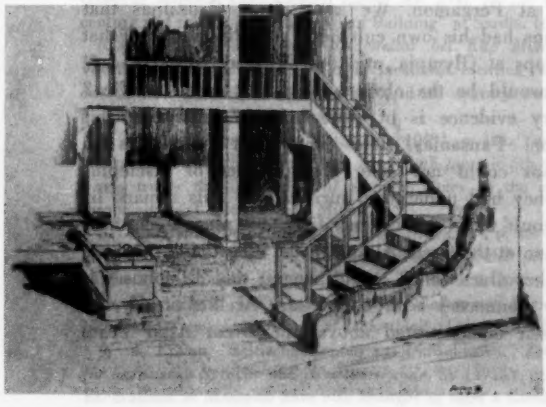


Fig. 10. House A VI 5, Olynthus. (D. M. Robinson, p. 259, Fig. 5.)

Fig. 11. Nereid Monument, Xanthus. (Neimann Restoration, F. Krischen, *Athen. Mittheil*, XLVIII, Fig. 60.)

Fig. 14. Tomb at Mylasa. (19th Century Engraving, Anderson and Spiers, pl. LXII.)

Asia-Minor. A preference for the rock-cut or the free-standing altar over the enclosed, temple-precinct altar was from the beginning part of Ionian religious tradition. (The oldest altar of Hera at Samos dates from about 850 B.C.).[11]

It is my belief that the stepped, open-air altars, which in the 6th century suddenly appear in those regions of Ionia which were in closest contact with Egyptian civilization, represent not a survival of an ancient native form,[12] but a modernization of a traditional idea, that of the outdoor altar, after Egyptian prototypes. It is of interest that the colossal stepped altar remained peculiar to Asia Minor and, with two exceptions, did not spread to mainland Greece until Hellenistic times. It is also significant that these exceptions (the archaic "Throne of Apollo" at Amyclae and the altar of the Chians at Delphi [5th century]) should both have been the work of Ionian architects.

The important elements of the elevation of the Pergamon altar are the unbroken wall surface of the podium (with or without stepped stylobate) and the Ionic peristyle. A considerable advance has taken place from the simple one-storied Egyptian type altar on 6th-century Samos to the elevated peristyle altar building at Pergamon in the 2nd century B.C. Needless to say, this advance was not made overnight. Podium substructure and Ionic peristyle were first combined in the temple-like Ionic *heroon*. The evolution of this type takes place in Asia Minor. Even its beginnings can be traced here. At Trysa (Gjölbaschi) we find a court in which stands a Lycian gabled sarcophagus surrounded by a wall which bears a double frieze. This structure dates from the 5th century[13] and is representative of the first element mentioned (unbroken wall surface), here used to denote a funerary enclosure. However, these walls are not yet surmounted by an Ionic peristyle and are of interest for our development only as its hypothetical beginning. Also important as another possible source of our altar elevation is the Greek peristyle-house in Olynthus (Fig. 10).[14] Here the altars are placed within colonnaded courts as in Pergamon. However, the podium is lacking. We may also mention the new Didymaion[15] (perhaps the pre-Persian Didymaion as well, but the scanty remains of this older building do not reveal its entire plan) and the altar or "throne" of Apollo at Amyclae in this context.[16] Both of these colonnaded structures contained altars. The latter might possibly prove to be significant as a direct antecedent of Pergamon in function. Here again uncertain restorations prohibit a definite conclusion. In its typology, Amyclae would seem to stand somewhere between the Trysa and the Pergamene concept of the sacred enclosure. The "throne" at Amyclae apparently combined a funerary precinct (cult of Hyakinthos), a peristyle court containing an altar to Apollo, and a rectangular enclosure. It is the first occurrence of a free-standing colonnaded altar in the history of Greek architecture. This altar was built by an Ionian architect, Bathycles of Magnesia.

Amyclae differs from the Pergamene type of altar primarily in its lack of podium structure. The earliest demonstrable occurrence of a colonnaded podium is in the Nereid monument at Xanthus (410-400 B.C.) (Fig. 11).[17] Like the altar at Pergamon, it is decorated with frieze sculpture. The frieze, however, does not dominate the architecture as at Pergamon, but most probably merely formed narrow bands at top and bottom. The lower portion of this monument was a lofty podium, the upper a small reproduction of an Ionic tetrastyle peripteral temple. From Trysa and Xanthus a clear line may be drawn to Halikarnassos (Fig. 12),[18] Belevi (Fig. 13),[19] and Mylasa (Fig. 14).[20] Belevi and Mylasa are similar to the Mausoleum at Halikarnassos. All three are closely akin to the Great Altar at Pergamon in external elevation. Thus, by Hellenistic times a tradition of colonnaded podia had been established in Asia Minor. All of these structures, however, were funerary monuments and not altars. Prior to the Pergamon Altar (ca. 180 B.C.) there is no really certain example of any monument combining elements from these disparate types. The manner in which these two independent traditions coalesced at Pergamon is not entirely clear, but the following reasons for their synthesis seem plausible.

Political considerations at Pergamon made it necessary to glorify the civic and religious center of the small city-state. The high podium served to impress the exalted position of the altar, situated as it was on a high elevation, upon foreign visitors as they approached along the plain to partake in the biennial festival of Athena Nikephoros. The resemblance of the altar to earlier sepulchral structures of Asia Minor may also have a specific reason derived from the ideology of the Pergamene dynasty. The Attalids of Pergamon were proud of their descent from the legendary son of Hercules and Auge, Telephos, who was said to be buried somewhere at Pergamon. We know from Pausanias that Telephos had his own cult here, not dissimilar to that of Pelops at Olympia, and that he received sacrifice.[21] What would be the obvious place for such sacrifice? Literary evidence is of little help in answering this question. Pausanias states only that sacrificers to Telephos could not enter the precinct of Asclepius until they had undergone purification. This remark by itself could mean that the sacrifices took place somewhere else than at the Great Altar. On the other hand, we have two other clues which would suggest that Telephos was closely connected with the Altar. Architecturally, as has been demonstrated above, the Great Altar bears

strong resemblance to sepulchral monuments, and this resemblance is not likely to have been accidental. If now we seek a tenant for this quasi-sepulchral structure, we shall find that no one would be more appropriate than Telephos. The high podium could thus be explained as an effort to lift the immortal hero above the level of mortal humanity.[22] The second clue seems to substantiate the first. The Altar proper of the Great Altar is surrounded by the so-called "small frieze" or "Telephos frieze," which consisted of ninety-two finely carved marble slabs, of which roughly a third survived in a badly mutilated condition. They deal with the life of Telephos and Auge—clearly with the propagandistic intent of magnifying the fame of the local hero-founder. It has also been pointed out that there are numerous iconographical resemblances between the figures of this frieze and of 4th-century grave stelai excavated nearby.[23] Again it is not probable that these "iconographic quotations" had completely lost their funerary meaning.

A Pergamene spectator would be reminded of legendary connections which linked Telephos and Zeus and Athena. He would remember that Telephos, as the son of Hercules was also the grandson of Zeus. All Hellenistic kings liked to trace their parentage to Zeus. Zeus and Athena played leading roles on the great outer frieze of the altar—Zeus via Telephos and Hercules as the ancestor of the Attalids, Athena as the champion of the Heraclidae and thus as the logical protectress of the Attalid city. If our conjectures are valid, the altar may be understood as combining the functions of a *heroon* (funerary monument) associated with a hero-ancestor cult and of an altar to divinities closely related to this cult. This combination seems in fact not at all incongruous, since heroes often partook of the nature of gods and regularly received sacrifices.

We have distinguished in the Altar of Pergamon two separate architectural traditions. From a survey of the material it appears that its stepped podium structure had been originally sacrificial in character, while its surmounting colonnade had been associated with sepulchral architecture. We have endeavored to demonstrate how and why the two were brought together. Whether this synthesis occurred earlier as the product of an evolution or whether it was late and intentional, as here suggested, remains to be more definitely established.

(HARVARD UNIVERSITY)

1. C. M. Firth and J. E. Quibell, *Saqqarah* (Cairo, 1935), pl. 84 (north altar). J. P. Lauer, *La Pyramide à Degrés* (Cairo, 1935), pl. 53 (south altar). I wish to take this opportunity to thank Dr. Bernard V. Bothmer of the Boston Museum of Fine Arts for his invaluable help with the Egyptian material. His kind interest has been greatly appreciated.

2. E. Naville, *Deir-el-bahri* (London, 1895), I, pl. 7, pp. 7f.

3. Cf. K. Galling, *Der Altar in den Kulturen des alten Orients* (Berlin, 1925), II, pp. 62ff.

4. H. C. Butler, *Sardis* (Leyden, 1925), II,[1] pp. 82ff. This oblong structure, called by Butler the "Lydian Building," was later recognized to be an altar. It is contemporary with the older temple, i.e., considerably before 499 B.C., when both were destroyed in the Ionian revolt. A flight of seven steps occupies most of one side.

5. E. Buschor and H. Schleif, "Der Altarplatz der Frühzeit"; H. Schleif, "Der grosse Altar der Hera von Samos." Both, *Athen. Mittheil.* 58 (1933), pp. 146ff., 174ff. This is the largest preclassical stepped altar. Schleif dates the altar to the mid-6th century and relates it to the "Lydian Building" at Sardis. (cf. n.4.)

6. A. von Gerkan, *Der Poseidonaltar bei Kap Monodendri* (Berlin, 1925), pp. 465f. This altar is almost identical with the one at Deir-el-bahri. It dates to the mid-6th century and is the prototype of later colossal altars.

7. C. Yavis, *Greek Altars* (St. Louis, 1949), p. 121. Yavis cites two monumental altars of the type here. Both are mid-6th century. Yavis traces the innovation of stepped altars to the rock-cut throne-altars of interior Asia Minor.

8. E. Naville, *Deir-el-bahri* (London, 1895), II[1], p. 19. For the influence of Egypt on the Aegean during the Saite period see H. Stier, *Hellas und Ägypten* (Bericht über den 6. Internat Kongress für Archeol., 1939, pp. 282ff), A. Wiedemann, *Die ältesten Beziehungen zw. Ägypten und Griechenland* (Leipzig, 1883).

9. A. Erman, "Saitische Kopien aus Deir-el-bahri," *Zeitschrift für ägyptische Sprache und Altertumskunde*, 52 (1915), pp. 90-95. Excavations at Memphis have also brought to light a Greek 6th c. *kouros* of Egyptian limestone. If there were Greeks at Memphis in this period, it is reasonable to assume that they were also at Saqqarah nearby. Greek mercenaries accompanied the Nubian expedition of Psemthek II in 589 B.C.

10. E. A. Gardner, *Naukratis* (London, 1888), ii, pp. 33ff., plate II.

11. H. Schleif, "Der grosse Altar der Hera von Samos," *Athen. Mittheil.*, 58 (1933), pp. 174ff.

12. C. Yavis, *Greek Altars* (St. Louis, 1949), pp. 118ff.

13. W. B. Dinsmoor, *The Architecture of Ancient Greece* (3rd ed., London, 1950), p. 256. For discussion of other known *heroa*, see Dinsmoor, pp. 255ff., 328 ff.; E. Dyggve, F. Poulsen, K. Rhomaios, "Das Heroon von Kalydon," *Kgl. Danske Videnskat. Selskat, Skrifter Hist. Filosof. Raekke*, IV (1934); E. Dyggve, "A Second Heroon at Calydon," *Studies in Honor of D. M. Robinson*, I (1951), pp. 360ff.; E. Dyggve, "Der Apsissaal des Leonteion," *Actes XIVe Congrès hist. de l'art* (Bâle, 1936), pp. 198ff.; Th. Klauser, *Vom Heroon zum Martyrbasilica* (Bonn, 1942); André Grabar, *Martyrium*, I-II (Paris, 1946). Dinsmoor, p. 297, fig. 109, seems to imply that there is a *heroon* in the Bouleterion at Miletos.

14. D. M. Robinson, "Haus," Pauly-Wissowa, *Realencyklopädie*, Supplement, vol. VII (Stuttgart, 1940), cols. 252-278.

15. Th. Wiegand and H. Knackfuss, *Didyma* (Berlin, 1941), I, pp. 46ff., 121ff., plates 6, 7.

16. E. Buschor and W. von Massow, "Vom Amyklaion," *Athen. Mittheil.*, 52 (1927), pp. 1ff.

17. F. Krischen, "Der Aufbau des Nereidenmonuments zu Xanthus," *Athen. Mittheil.*, XLVIII (1923), pp. 69ff.

18. Krischen's reconstruction (fig. 12) is not necessarily the best. For others, see Dinsmoor (3rd ed.), plate 63 and p. 376, bibliography.

19. J. Keil, "Vorläufiger Bericht über die Ausgrabungen in Ephesus," *JÖAI*, XXIX (1934), pp. 104ff.

20. Dinsmoor (3rd ed.), p. 330, plate 71.

21. Pausanias, III, 26.9. Telephos comes closest to being a *heros ktistes*. Cf. Pauly-Wissowa, "Heros," for definition.

22. On this point cf. Arif Müfid, *Stockwerkbau der Griechen und Römer* (Leipzig, 1932), p. 99.

23. Winter, "Die Skulpturen mit Ausnahme der Altarreliefs," *Altertümer von Pergamon* (Berlin, 1908), VII, pp. 303-305, 329-334.

OTTO G. VON SIMSON teaches at the University of Chicago. This article is drawn from two public lectures he gave last January for the Committee on Social Thought there. He wishes to dedicate it to his mother. His analysis of the philosophical approach to architecture, which St. Augustine, St. Bernard and other eminent divines fostered, would give pause to those who think we ought to make up our minds as to what the cathedral was built with: all science or all intuition.

THE GOTHIC CATHEDRAL: DESIGN AND MEANING

Within the last century the history of architecture has sought to explain the origin and meaning of the Gothic cathedral by singling out, one after the other, three of its main aspects: function (Gothic solution of statical problems), design (Gothic form as the expression of certain esthetic principles), and significance (Gothic form as the symbolic expression of certain ideas). The interpretations based upon each of these three aspects stand in a curious relationship to one another. Developed polemically and antithetically, each has sought to interpret Gothic architecture in terms of one of the three aspects, denying or belittling the significance of the two others. In point of fact, each of the three approaches has greatly advanced our knowledge; it seems to us today as if they not only complement, but actually point toward one another, encircling, as it were, a truth that lies in their midst.

Thus it is precisely to the history and analysis of Gothic form that we owe the knowledge that this form cannot be entirely understood in terms of stylistic development. Gothic architecture emerges suddenly and almost simultaneously with the great expressions of Romanesque art, not its heir or "logical sequel," but its rival and antithesis. The first Gothic art, moreover, is geographically so closely identified with one territory and its historical destinies that the late Henri Foçillon suggested, paradoxically but wisely, that Gothic be defined as the Romanesque of the Ile de France. The new style, finally, seems to have been the creation of a small group of men whose ideas we know and who were mutual friends; we are prompted to ask whether Gothic art must not be understood as an expression of these ideas.

In other words, the stylistic analysis of Gothic architecture has suggested its interpretation as the expression of certain ideas. And this second approach, the symbolic one, though long regarded with some suspicion, has recently attracted a good deal of attention. We have been reminded that the Christian sanctuary is, liturgically and mystically, an image of the heavenly Jerusalem, the eschatological vision described by the Book of Revelation. The medieval dedication rite establishes this relationship in explicit terms and the twelfth and thirteenth centuries appear singularly preoccupied with this symbolic significance of sacred architecture. May not this significance have actually determined the design of the cathedral? Indeed, a brilliant and provocative attempt has been made recently to interpret all the essential aspects of Gothic design as representations of the celestial city.[1] Such an attempt, to be sure, encounters serious difficulties.[2] But it is heuristically valuable in that it compels us to define the exact relation between the stylistic structure and the significance of the Gothic cathedral, throwing an entirely new light upon its esthetic as well as structural aspects.

The most striking feature of the new style is a new relationship between function and form, structure and ornament. In Romanesque (and Byzantine) architecture structure is a technical means to an artistic end; it remains concealed behind painted or stucco ornaments. Indeed, the entire edifice is often but an invisible scaffold for the display of great murals and mosaics. These compositions, especially the figure of Christ in Majesty surrounded by his heavenly court that usually adorns the Romanesque apse, evoke the symbolic significance of the sanctuary as an image of the celestial city. That the structure of the building is concealed by these images reveals the spiritual source of Romanesque "anti-functionalism": the celestial vision depicted is to make us forget that we stand in a building of stone and mortar. In the Gothic cathedral the relation between structure on the one hand and ornament and its symbolic function on the other is quite different. Here the design is entirely

determined by the pattern of the structural members, vault ribs and shafts. It has been remarked that the flowering of the Romanesque mural was in large part due to the technical imperfections of the buildings it adorned, that wall painting declined in the measure in which these imperfections were overcome. In Gothic architecture, the wonderful precision with which every single block was shaped in the vault (leaving no ragged joints that it was necessary to conceal) suggests a new esthetic appreciation of the dignity of structural perfection.[3] This tectonic system is never concealed but rather underscored by Gothic wall painting. Even the stained glass windows submit, in composition and design, increasingly to the pattern of the stone and metal armature in which they are imbedded. The esthetic function of these windows is not only the creation of a new luminosity; the light they admit dramatically underscores the web of tracery, ribs, and shafts.

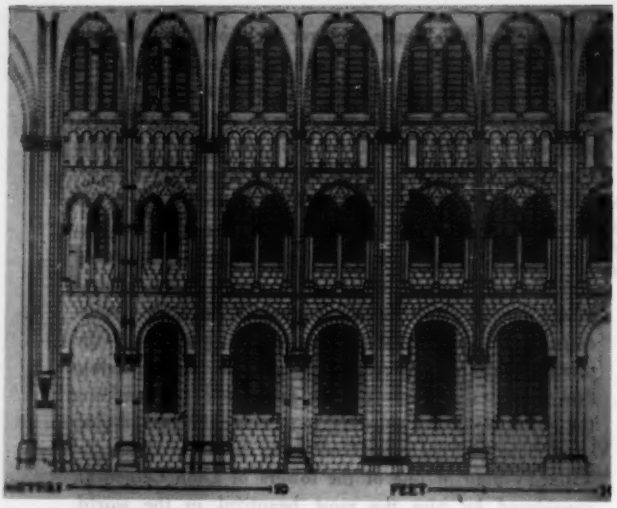
This new esthetic dignity ascribed to structure cannot be understood in terms of modern functionalism. Architectural form reveals function if it actually shows the physical interaction of weight and support as it does in the Greek temple. What concerned the Gothic builder was not such naked expression of statical function but rather the translation of function into an essentially graphic system. By concealing volume or "dissolving" it into a bundle of frail shafts, he obtained the visual effect of a geometrical grid on a two-dimensional surface.[4] With this qualification, however, Gothic architecture is indeed functionalist. And its emphatic recognition of structure is all the more remarkable if we recall the symbolic significance of the sanctuary. As we shall see, the "functionalist" aspect of Gothic art will help us understand the precise nature of its symbolic aspect, just as the latter is indispensable for a correct definition of Gothic functionalism.

It is hardly necessary today to stress the overwhelming importance of geometry in Gothic design. The reliance on geometrical formulae, apparent in every Gothic ground plan and elevation, is amply attested by medieval documents. So much research has been done in recent years on this question that I can limit myself to a brief summary. With but a single basic dimension given, the Gothic architect developed all other magnitudes of his ground plan and elevation by strictly geometrical means, using as "modules" certain regular polygons, above all the square. The knowledge of this way of determining proportions was considered so essential that it was kept a professional secret. Only toward the end of the fifteenth century—and of the cathedral age—was it made public by Matthew Roriczer, the builder of Regensburg cathedral. He teaches "how to take the elevation from the ground plan" by means of a single square. From this figure Roriczer derives all proportions of his edifice inasmuch as its dimensions are related to one another as are the sides of a sequence of squares the areas of which diminish (or increase) in geometrical progression. The proportions thus obtained the master considered to be "according to true measure."[5]

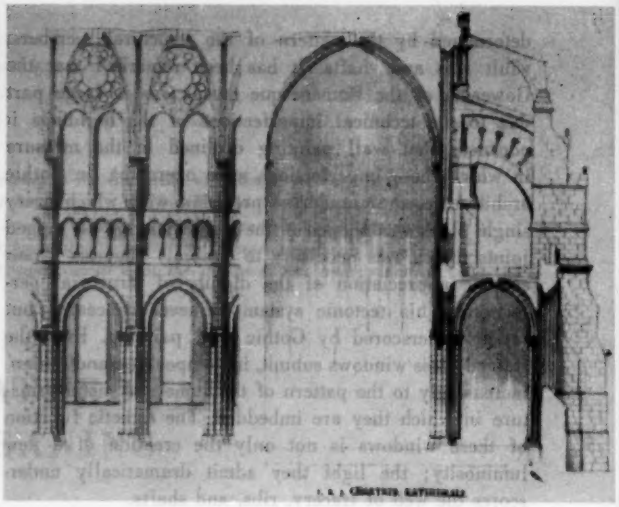
It was not only this late Gothic architect or the German lodges that made such modular use of the square. Perhaps the most important single piece of evidence regarding the principles of Gothic design is the famous model book by the Picard architect Villard de Honnecourt, who was active in the second quarter of the thirteenth century. He, too, demonstrates how to double (or halve) a square for the purpose of determining the proportions of a building, in this case the ground plan of a cloister. That this is no mere theory is shown by Villard's plan of one of the towers of Laon Cathedral, considered by him the most beautiful in the world. This plan indicates, as Ueberwasser has shown, that all horizontal subdivisions of the tower are recessed "according to true measure."

The square—along with the other polygons, such as the famous $\pi/4$ triangle, which the medieval architect derived from the square—and the proportion "according to true measure" have determined Gothic design to a remarkable extent. The façade of Notre Dame of Paris is composed of a sequence of four squares developed according to true measure. Of course geometrical formulae had been used by pre-Gothic architects too. Here, however, they were practical rather than artistic devices of which the observer usually remains unconscious. Nowhere do they determine the esthetic impression as they do in the Gothic system. One might almost say that the development of the style, from its origin to the classical maturity reached in the mid-thirteenth century, is marked by the gradual triumph of geometrical proportion. If we compare the façade of Notre Dame with the similar and earlier one of Noyon, we realize the increasing clarity with which the geometrical principle is realized in the Paris façade.

The same principle rules over all parts of the Gothic cathedral. F. Bond was struck by the tenacity with which the square is retained in the Gothic ground plan even after the advantages of oblong bays from the viewpoint of vaulting had been discovered. We shall soon return to this phenomenon. The square is equally apparent in the Gothic elevation. That of Noyon is a good starting point. The nave was built during the last third of the twelfth century. Thanks to the fine analysis of Charles Seymour, Jr., we know how the work progressed from East to West and how this progress involved stylistic changes that mark this transition from Romanesque to Gothic. In the proportions of Noyon the geometrical element is, as Seymour observes, not yet prominent. We



Noyon, elevation. (After Charles Seymour, Jr.)



Chartres, elevation and cross-section. (After Dehio-V. Bezold.)

encounter "shifts of design and alterations of proportions" in almost every bay. Even so, it is significant that only in the three Western bays, which were completed last, is the relation of the width of an aisle to that of the main vessel "brought to a ratio of nearly exactly one to two." In the elevation of the nave, moreover, the stringcourse under the galleries marks off a height equal to the distance between the main piers; and the square thus described occurs a second time since the distance from the stringcourse to the windowsills of the clerestory is again the same.

But the Gothic trend toward "geometrical functionalism" appears elsewhere at Noyon. He who designed this elevation perceived the relation of weight and support not as the interaction of physical bodies, but as an abstraction, as an interplay of lines. The columns under the nave arcades are the only architectural members designed and articulated according to their statical function; they alone unequivocally suggest volume. But they represent an old-fashioned element, doomed gradually to disappear from Gothic architecture. The main piers remain partly embedded within the wall which conceals their bulk. The intermediary shafts, slender like bamboo shoots, could not even maintain themselves were not they, in turn, braced by the walls between them. As the work progressed, the architects suppressed everything that might divert attention from the interplay of lines. Thus ornaments and even corbel rings disappear from the later sections of the nave, capitals become smaller and simpler until only the austere web of horizontals and verticals remains.

If, on the other hand, we compare Noyon with the first—and mother—of the classical cathedrals, that of Chartres, geometrical proportion suddenly seems to have come into its own. The ground plan of Noyon is Romanesque in that it suggests an additive process of composition: one could easily add or eliminate one or more of the rectangular units of which it is composed. The ground plan of Chartres presents the compact unity and cohesion of an organism. This unity is due to proportion. Dehio was the first to notice that this plan is based on the Golden Section, since the center of the crossing divides the entire edifice in the ratio 5:8. The main proportions of the ground plan, moreover, determine those of the elevation. The church is as high as is the distance from the center of the crossing to the end of the choir (excluding the apse) and of the transepts. And the great square described by the crossing and by each double bay of the nave also reappears in the elevation: the height to the first stringcourse being equal to the side of this square, the architect has created a series of "spatial cubes" that is quite noticeable to the observer. And this square reappears once again in the elevation, since its side is equal to the length of the slender shafts that support the vault ribs. If we increase this square "according to true measure" we obtain the height of the entire nave to the windowsills. Finally, the Golden Section appears in the elevation as it does in the ground plan, determining the proportion between the piers (to the arcade imposts) and the shafts above them.[6]

What matters is not only the existence of these measurements, but the way in which the architect has brought them to our attention. He has sprung his fourpartite vaults over transverse oblong bays, but has not entirely sacrificed the square: Chartres cathedral presents the alternating system of supports, in some respects

an obsolete feature that occurred in Sens and Noyon but had already been dropped in Notre Dame of Paris. It is interesting to see how the master of Chartres employed alternation without sacrificing the homogeneity of identical supports. His piers consist, alternatively, of a cylindrical core surrounded by octagonal colonnettes and of an octagonal core surrounded by cylindrical colonnettes. The variation is just sufficient to induce the eye to see not one but two bays as one unit and thus to notice the square in the ground plan and the "cube" in the elevation. The main proportions of the elevation are made evident by the simple grid of intersecting verticals and horizontals. And our eye is similarly directed to notice the proportion (of the Golden Section) obtaining between the main parts of the supports; only one of the shafts in each compound lacks a capital under the nave arcade; it is the one facing the nave and just beneath the respond that rises to the springing of the transverse rib. We thus see the entire vertical member as one, harmonically subdivided, unit.

It is worthwhile to compare the elevations of Noyon and Chartres. The younger cathedral is nearly fourteen meters higher, yet it conveys the impression of far greater horizontal unification. The abandonment of the four-partite elevation in favor of the three-partite one is an important means to this end. The harmony of the Golden Section welds both the vertical and horizontal system of Chartres into an indissoluble unity. These proportions strike one as necessary and definitive, whereas the master of Noyon appears to be still groping for the right ratios. Equally increased is the tendency toward the two-dimensional in Chartres. With the elimination of the galleries, the side aisles have become narrower and lighter, a luminous membrane rather than a shadowy depth enveloping the nave. The *piliers cantonnés*—which the master of Chartres, as Panofsky observes,[7] employs for the first time—further accentuate the graphic tendency, seemingly reducing the solid core of the supports and dissolving their volume into the vertical rhythm of lines.

It ought not to be assumed that the line drawings we have been studying convey an inaccurate notion. In every other architectural style they would indeed give but a faint semblance of what the architect actually intended to build. Not so in Gothic. One has to look at the architectural drawings of the age—such as Villard de Honnecourt's or those of the contemporary Reims palimpsest, or the magnificent later collections from the cathedral lodges of Prague and Vienna—to realize that for their authors these drawings were not abstractions but the ideal which the completed edifice must seek to approximate. These wonderful systems of lines suggest neither space nor volume. Not until the end of the fourteenth century is there any indication of perspective.[8] It is as if these masters, as unconcerned with physical laws as with appearance, had been preoccupied solely with the reality of geometrical proportions.

Why this submission to geometry? One reason often given is a practical one: with measuring units varying from place to place, yardsticks were unknown or unusable; hence the use of proportions, in architectural drawings or models, that could be translated into large dimensions by geometrical means only. This explanation is but partially adequate, however. Villard de Honnecourt supplies numerical indications of size in a technical drawing, but always relies on geometry in his architectural designs. The proportion "according to true measure," whatever the facility of its practical execution, occurs, as Ueberwasser has shown, in Gothic paintings and engravings where the problem of translating one dimension into another did not enter. The Gothic artist would have overthrown the rule of geometry had he experienced it as a fetter. Yet he did not use geometrical formulae for purely esthetic reasons either; they occur in places where they are invisible to the observer. In short, the alternative "practical or esthetic" does not make sense in medieval terms. Happily, at least one literary document survives that explains the use of geometry in Gothic architecture: the minutes of the architectural conferences held during 1391 and the following years at Milan.

The cathedral of Milan was begun in 1386. After a few years difficulties developed and foreign advisors were called in from France and Germany. The minutes of the discussions between them and their Italian colleagues have survived. Two aspects of the deliberations are of importance in our present context: first, the reliance on geometric figures, attested by the German architect, Roriczer, of the fifteenth century, and the French architect, Villard de Honnecourt, of the thirteenth, is emphatically confirmed by the Italian document of the intervening century. The question debated at Milan is not whether or not the cathedral is to be built according to a geometrical formula, but merely whether the modular figure to be used is the square (which had already determined the ground plan) or the equilateral triangle.[9] The second and even more significant aspect of the Milan documents is that they suggest the reason for this use of geometrical formulae. The minutes of one particularly stormy session recall an angry dispute between the French expert, Jean Mignot, and the Italians. Overruled by them on a technical issue, Mignot remarks bitterly that his opponents have set aside the rules of geometry as if science were one thing and art another. Art, however, he concludes, is nothing without science, *ars sine scientia nihil est.* The terms art and science do not mean what they mean today. Art for Mignot is the practical know-how gained from ex-

perience; science the ability to account for the reasons that determine sound architectural procedure by rational and more precisely by geometrical means. In other words: architecture is scientific inasmuch as it is based on geometry, and unless he obeys the laws of geometry the architect must fail. This argument was considered unassailable even by Mignot's opponents. They hasten to affirm that they are in complete agreement and have nothing but contempt for an architect who presumes to ignore the dictates of geometry. It is taken for granted by both sides that the stability and the beauty of the edifice are not distinct, do not obey different laws, but are both comprehended in the perfection of geometrical forms.

Thus, the Milan document answers our question regarding the function of geometry in Gothic architecture. I think it also provides the clue to the reasons underlying what seems to us an almost superstitious belief in mathematics. Jean Mignot's juxtaposition of *ars* and *scientia* recalls, like a faint echo, the distinction that occurs almost a millenium before in the most influential esthetic treatise of the Middle Ages.

In the first book of his treatise, *De Musica*, St. Augustine defines music as the "science of good modulation." Before telling us what good modulation is, he explains why music, properly understood, is a science. He does not deny that music can be produced by instinct or practical skill, just as music can be appreciated by one who just "knows what he likes." Such understanding of music, however, creative or receptive, is but of a low order, according to Augustine. Vulgar performers and vulgar audiences have such an understanding; even a singing bird has. In fact, there is little difference between man and beast in regard to this kind of musical knowledge which Augustine calls contemptuously *art*. The true understanding of music, on the other hand, that knows the laws which are of its very essence, applies them in musical creation and discovers them in music, is what Augustine calls the *science* of music, and he goes on to explain the nature of this science as mathematical. The science of good modulation is concerned with the relating of several musical units according to a module, a measure, in such a way that the relation can be expressed in simple arithmetical ratios. The most admirable ratio, according to Augustine, is that of equality or symmetry, the ratio 1:1, since here the union or consonance between the two parts is most intimate. Next in rank are the ratios 1:2, 2:3, and 3:4, the intervals of the perfect consonances octave, fifth, and fourth. It is to be noticed that the pre-eminence of these intervals, for Augustine, is not derived from their esthetic or acoustic qualities. These are, rather, audible echoes of the metaphysical perfection which Pythagorean mysticism ascribes to number, especially to the four numbers of the *tetractys*. Without the principle of number, as Augustine calls it, the cosmos would return to chaos. Taking up the Biblical passage *Omnia in mensura et numero et pondere disposuisti*, Augustine applied Pythagorean and neo-Platonic number mysticism to the interpretation of the Christian universe, its creation, and its order. He shares with Plato both a distrust of the world of images and the belief in the absolute validity of mathematical truths. Platonic metaphysics is also the basis for Augustine's philosophy of art. The views he formulated, not only as regards the function of the arts in the Christian commonwealth, but also, one may say, as regards its style, have left their imprint on Christian art during a thousand years. This influence has three aspects.

1. The principles of good musical modulation and its appreciation which Augustine established in *De Musica* are mathematical principles and therefore apply, in his opinion at least, to the visual arts as they do to music. On the monochord, the musical intervals are marked off by the divisions on a string; the arithmetical ratios of the perfect consonances thus appear as the proportions between different parts of a line. And since Augustine adduces the musical value of the perfect consonances from the metaphysical dignity of the ratios on which they are based, it was natural for him to conclude that the beauty of certain visual proportions derives from their being based on the simple ratios of the *tetractys*. The place Augustine assigns to geometry among the liberal arts, like the place he assigns to music, is due to its "anagogical" function, that is, its ability to lead the mind from the world of appearances to the contemplation of the divine order. In the second book of his treatise *On Order* Augustine describes how reason, in her quest for the blissful contemplation of things divine, turns to music and from music to what lies within the range of vision: beholding earth and heaven, she realizes that only beauty can ever satisfy her, in beauty figures, in figures proportion, and in proportion number. The esthetic implications are clear. Augustine was quite as sensitive to architecture as he was to music. They are the only arts he seems to have fully enjoyed, and he recognized them even after his conversion, since he experienced the same transcendental element in both. For him, music and architecture are sisters, since both are children of number; they have equal dignity, since architectural mirrors eternal harmony as music echoes it.

2. Augustine uses architecture as he does music to show that number, as apparent in the simpler geometrical proportions that are based on the "perfect" ratios, is the source of all esthetic perfection. And he uses the architect, as he does the musician, to prove that all artistic creation follows the dictate of number, even though the architect, if he is a mere practitioner rather than a scientist of his art, may be unable to account rationally

for his instinctive use of mathematical rules. Such views, of course, confine artistic design and composition within the rigid limits of metaphysical doctrine. Along with a real appreciation of the abstract mathematical beauty that may and perhaps always does underlie artistic composition, Augustinian esthetics harbors a profound distrust and contempt of the image, the semblance of living form that may obscure the anagogical function of the work of art. And even the proportions he admits are limited to the "perfect" ratios of Pythagorean mysticism.

3. That Augustinian thought has profoundly influenced Western art during the Middle Ages, both in its recurrent iconoclastic tendencies and in its mathematical character, is beyond question. We are apt to underrate the positive consequences of this influence. While stripping the arts, and above all architecture, of much of their life, it also assigned to them an extraordinary dignity and mission. Because true beauty is, according to Augustine, anchored in a metaphysical reality, the contemplation of visual and musical harmony will actually lead the soul to the experience of the ultimate harmony and unity that is God.

The Middle Ages never questioned Augustine's authority. The passage from the Book of Wisdom "Thou hast disposed everything according to measure and number and weight," and the interpretation he had given to it, became, as has rightly been observed, the key word to medieval thought and learning until the advent of Aristotle. E. R. Curtius has recently shown how this world view, through number composition, has affected both the content and the form of medieval poetry. It has left an even greater impact on medieval art.

Augustinian esthetics were never forgotten during the Middle Ages. In the twelfth century, however, they gain an unprecedented importance in the Ile de France, under the influence of two movements, the first intellectual and speculative, the second spiritual and ascetical. The first centers in the group of Platonists assembled at the school of Chartres, the second in the monastic reform emanating from Citeaux and embodied by Bernard of Clairvaux. French civilization in the twelfth century is in an important sense the synthesis of these two trends which, though distinct, are yet closely interconnected by personal and intellectual ties. Their common bond is the legacy of St. Augustine, their lasting achievement the creation of Gothic art.

The Platonism of Chartres was in many respects a true Renaissance movement. The group of men who gathered there in the second quarter of the twelfth century were primarily interested in theological and cosmological questions, to be solved by means of a synthesis of Platonic and Christian ideas. These early scholastics approached their task in a spirit of tolerance and respect with regard to the thought of antiquity that often reminds one of the "universal theism" of the fifteenth century; yet, theirs was a strange Platonism indeed. It was almost entirely based on one single treatise, the *Timaeus*. Of this treatise but a fragment was available; of this fragment not the Greek original, but only a garbled translation along with two commentaries—by Chalcidius and Macrobius—that viewed Plato's cosmology through the lenses of an eclectic and confused neo-Platonic mysticism. The Platonic fragment (and the two mediocre commentaries) were approached by the theologians of Chartres with nearly the same awe and respect as was the Book of Genesis. Both works, it was believed, were in substantial agreement in what they revealed about the creation of the universe, indeed, about the Creator himself. If one considers that the theology and cosmology of Chartres resulted largely from the interpretation of two documents as different as Plato and the Bible, but approached with the notion that they must not contradict each other and that the interpreter must not contradict either, one can but marvel at the wonderful and daring speculative system that resulted.

The aspects of the theology and cosmology of Chartres that interest us most in our present context are, first, the emphasis on mathematics, particularly geometry, and, second, the esthetic consequences of this thought.[10] The masters of Chartres, like the Platonists and Pythagoreans of all ages, were obsessed with mathematics; it was considered the link between God and world. The most influential exponent of the system, Thierry of Chartres, hoped to find, with the help of geometry and arithmetics, the divine artist in his creation; he went further and sought to explain the mystery of the Trinity by geometrical demonstration. The equality of the Three Persons is represented, according to him, by the equilateral triangle; the square unfolds the ineffable relation between Father and Son. Thierry recalls that Plato "like his master Pythagoras" identified the metaphysical principles of monad and dyad with God and matter, respectively. God is thus supreme unity, and the Son is unity begotten by unity as the square results from the multiplication of a magnitude with itself. Rightly, Thierry concludes, is the Second Person of the Trinity therefore called the first square. It has been said, that, under Thierry's influence, the school of Chartres attempted to transform theology into geometry. The attempt, which appears so strange to us, conveys a glimpse of what geometry meant to the twelfth century.

More daring than this theology, more dubious from the standpoint of orthodoxy, and more significant for the art historian is the cosmology of Chartres and the philosophy of beauty which it engendered. In the *Timaeus* Plato describes the division of the world soul according to the ratios of the Pythagorean *tetractys*. The esthetic, especially musical, connotations of this

idea, barely hinted at by Plato, are underscored by Chalcidius who points out that the division is effected according to the ratios of musical harmony. He, as well as Macrobius, insists that the Demiurge, by so dividing the world soul, establishes a cosmic order based on the harmony of musical consonance.

It was easy to fuse this notion with the Augustinian idea of a universe created "according to measure and number and weight." As a result the creation appeared as a symphonic composition. It is so described in the ninth century by John Scrotus Erigina, and the idea was seized upon by the school of Chartres. William of Conches, the teacher of John of Salisbury, and Abelard, who seems to have studied mathematics under Thierry and whose cosmology is that of the school of Chartres, both identify the Platonic world soul with the Holy Ghost in its creative and ordering effect upon matter; and they conceive this effect as musical consonance. The harmony it establishes throughout the cosmos is represented, however, not only as a musical composition but also as an artistic one, more specifically, as a work of architecture. The ease with which the transition from the musical to the architectural sphere is here effected must not surprise us in view of the sistership of the two in Platonic and Augustinian thought. But for the theologians of Chartres, the notion of the cosmos as a work of architecture and of God as its architect has a special significance, since they assume a twofold act of creation: the creation of chaotic matter, and the creation of cosmos out of chaos. The Greek word *cosmos* signifying ornament as well as order, it was plausible to view matter as the building material, the creation proper as the "adorning" of matter by the artful imposition of an architectural order. In the Platonic cosmology, moreover, the masters of Chartres could detect the design and method according to which the divine architect had built the universe, the cosmic temple as Macrobius calls it.

In the *Timaeus* the primary bodies of which the world is to be composed are conceived as building materials ready to be put together by the builder's hand. This composition is effected by means of fixing the quantities in the perfect geometrical proportions of squares and cubes (1:2:4:8 and 1:3:9:27) —the same proportions that also determine the composition of the world soul. According to this composition, the world's body, consisting of the four primary bodies, whose quantities are limited and linked in the most perfect proportions, is in unity and concord with itself and hence will not suffer dissolution from any internal disharmony of its parts; the bond is simply geometrical proportion.[11] In this view, the perfect proportions, the beauty of which we may admire in musical and in architectural compositions, also acquire an explicit technical or tectonic function: these proportions chain and knit together the different elements of which the cosmos is composed. William of Conches quite correctly interprets the Platonic passage in this sense. Here, then, perfect proportion is thought to account for both the beauty and the stability of the cosmic edifice.

The significance of these ideas for the history of architecture is very real. Some years ago N. Pevsner pointed out that the term architect is rarely used in the Middle Ages and, if it is, denotes either clerics interested or experienced in architecture, or masons.[12] Pevsner concluded that the professional architect, in the classical sense (which is also the modern one), hardly existed in the Middle Ages, and suggested that the revival of the term in the mid-thirteenth century coincides exactly with the change from the humble master mason to the architect of the thirteenth century, no longer considered as a craftsman but as the principal artist and a "theoreticus" or scientist. There may be a good deal of truth in all this, but Pevsner is surely wrong when he seeks to connect this sociological and philological development with the introduction of Aristotle's *Metaphysics* (where *architect* is defined in our sense) to Western thought after 1200. Quite apart from the writings of Vitruvius, known and studied since Carolingian times, it was Augustine who kept alive the classical definition of the architect. His distinction between the mere practitioner and the true architect who deliberately applies scientific principles occurs in at least three different treatises, all studied and admired throughout the Middle Ages. While this definition permitted the application of the term architect even to the mere craftsman, it left no doubt that only the "scientist" schooled in the liberal arts was truly entitled to it. And since knowledge of the *quadrivium* was generally the privilege of clerics, it is not surprising to find so many ecclesiastics among medieval builders and the term architect so often applied to them.

But it was the school of Chartres which dramatized the image of the architect in the classical sense (more than a century before Aristotle's *Metaphysics* could have done so) by depicting God as a master builder, a *theoreticus* creating without instrument or effort by means of an architectural science that is essentially mathematical. And not only Augustine but Boethius, the greatest mathematical authority of the Middle Ages, taught the school of Chartres how to visualize in geometrical terms the perfect consonances. He points out that the proportions of double, half, triple, and third—those, in other words, that marked the perfect ratios on the monochord—are as readily perceived visually as they are acoustically, for, he continues, echoing the *Timaeus*, "the ear is affected by sound in quite the same way as the eye is by sight." And Boethius confines this doctrine of synesthesia not only to the proportions of line or surface; he discovers "geometrical harmony" in the cube since the number of its surfaces, angles, and edges—6:8:12—contains again the ratios of the consonances.

Toward the end of the twelfth century—at a time when the first Gothic cathedrals were nearing completion—

Alanus ab Insulis described the creation of the world. To Alanus, the *doctor universalis,* the Platonism of Chartres owes probably its widest influence and diffusion. To him, God is the artful architect *(elegans architectus)* who builds the cosmos as his regal palace by composing and harmonizing the different genera of created things with the "subtle chains" of musical consonance.

The impact of these views on the architecture and architectural procedure of the twelfth and early thirteenth centuries cannot be overestimated. Since art is an image of nature, Professor de Bruyne asks, "must not the ideal church be constructed according to the law of the universe?" We suddenly understand why the high Middle Ages defined and practiced architecture as applied geometry; why the experts at Milan pay such astonishing tribute to this discipline. And we also understand why the great lay architects of the Gothic period have themselves invariably depicted, ruler and compass in hand, as geometricians. With these same attributes the creator himself was represented. Only by observing geometrical principles did architecture become a science in Augustine's sense; by submitting to its laws, the human architect imitated his divine master and in doing so his calling acquired metaphysical significance.

In order to understand this significance of Gothic architecture we must bear in mind that the musical harmony which the Christian Platonists beheld in the cosmos is primarily not a physical but a metaphysical principle. Medieval man looked upon the creation as the first of God's self-revelations, the Incarnation of the Word being the second. Between the two the twelfth century perceived innumerable mystical correspondences. The theological meaning of the universe had been obscured through Adam's fall on earth. It still appeared clearly in the perfection of God's celestial palace. Hence the tendency, familiar to every reader of Dante, to link the realm of the stars with the celestial mansions; hence also the seemingly dual symbolism of the cathedral which is at once an image of the cosmos and of the celestial city. If the Gothic architect designed his sanctuary according to the laws of harmonious proportion, he did not only imitate the perfection of the visible world but also created an image, in as much as that is possible to man, of an invisible one.

The symbolic concatenation is well explained in a passage of Abelard. After identifying the Platonic world soul with world harmony, he first interprets the ancient notion of a music of the spheres as referring to the "heavenly mansions" where angels and saints "in the ultimate sweetness of harmonical modulation" render eternal praise to God. Then, however, Abelard transposes the musical image into an architectural one. He relates the celestial Jerusalem to the terrestrial one, more specifically to the Temple built by Solomon as God's "regal palace" and at once a model for the Christian sanctuary and a mystical image of Heaven. This temple, Abelard remarks, was pervaded by the divine harmony as were the celestial spheres. The passage reflects the influence of Platonic cosmology upon Christian eschatology and symbolism in the twelfth century, the notion of an ineffable harmony gradually subdues the imagery by which the celestial city had formerly been depicted. This notion goes far to explain the transition from Romanesque to Gothic, the striking rule of harmonious proportion in the new style that emerges around 1140.

It must be emphasized at this point that the musical mysticism of the Platonic tradition was by no means the exclusive property of the School of Chartres. Embodied in Augustinian thought, it influenced the spiritual formation of the monastic movement that centered in Cîteaux and Clairvaux and is personified by St. Bernard. As I remarked earlier, this movement contributed as much to the civilization of the twelfth century as did the Platonism of Chartres, and both trends are intimately related. It is time to consider Bernardine thought in its impact upon Gothic art.

Bernard's artistic views are usually described as those of a Puritan. They are in point of fact Augustinian. No other author has had greater influence upon Bernard's theological formation than Augustine. He considered the Bishop of Hippo the greatest theological authority after the Apostles; with Augustine, Bernard writes, he wants to err, as well as to know. And Augustine musical mysticism could claim as its greatest spokesman. The following passage gives an idea of the place and function of music in Augustine's theological experience. In his treatise *De Trinitate* he meditates on the mystery of Redemption by which the death of Christ atoned for man's twofold death of body and, through sin, of soul. As the Bishop of Hippo ponders this "congruence," this "correspondence," this "consonance" of one and two, musical experience gradually takes hold of his imagination, and suddenly it dawns upon him that *harmony* is the proper term for Christ's work of reconciliation. This is not the place, Augustine exclaims, to demonstrate the value of the octave which seems so deeply implanted in our nature—by whom if not by Him who created us?—that even the musically and mathematically untrained immediately respond to it. Augustine feels that the mystery of Redemption is conveyed to human ears by the consonance of the octave, the musical expression of the ratio 1:2. The remarkable passage conveys an esthetic experience radically different from our own. It was not the primary enjoyment of musical consonances that led Augustine to interpret these as symbols of metaphysical or theological truth. On the contrary, the consonances were for him echoes of such truths and the enjoyment

which the senses derive from musical harmony (and its equivalent, geometrical proportion) is our intuitive response to an ultimate reality that may defy reason but to which our entire nature is wonderfully attuned.

This experience determines the medieval attitude towards music. It accounts for the emphasis on musical studies even, and especially, in the monasteries of strict ascetical observation. To take a typical example, Othlon of St. Emmeram (1032-70), in embracing the most austere monastic ideal, renounced all his former humanistic interests. But arithmetic and music retain their mystical function for him; he uses them in his writings to convey divine secrets to his fellow monks, to prepare them for the life in a world to come. Even the order prevailing among the heavenly hosts, he writes, corresponds to the intervals of the perfect consonances.

Bernard's attitude towards music was quite similar. He was profoundly musical, and, as Father Luddy observes, an Augustinian even in musical matters. Something of a composer himself, he was once invited by the abbot of another monastery to compose an office for the feast of St. Victor. Bernard's reply is noteworthy. What he demands of ecclesiastical music is, above all, that it "radiate" truth, "sounding" the great Christian virtues and kindling the light of truth. Music, Bernard thinks, should please the ear in order to move the heart; it should, by striking a golden mean between the frivolous and the harsh, wholesomely affect man's entire nature.

These are not the views of a Puritan. Bernard must have responded to musical experience with unusual sensitivity. In demanding that music be attuned to the great metaphysical and ethical experiences of Christian life, he confronted music, not with an attitude restricting its creative scope, but with a challenge. The importance of Bernard's views on music for our present inquiry lies in the fact that they also provide an indispensable clue to his convictions regarding the visual arts. That the laws of music, generally understood, "embrace everything," that they extend to all the arts is a view frequently expressed during the Middle Ages.[13] And to a man steeped, as Bernard was, in the Augustinian tradition, not only the metaphysical dignity of the perfect consonances but their presence in the sister art of music, architecture, must have been self-evident.

The appraisal of Bernard's views regarding religious architecture must rely not only on the opinions he expressed in literary form but on the testimony of Cistercian architecture, the design of which was certainly determined by his views. Bernard's demand that the "monstrous" imagery of Romanesque art—and in fact all images besides the crucifixus—be banished from the Cistercian cloister and church; his attack upon the "immense" height, the "immoderate" length, the "supervacuous" width of the Cluniac churches are but a negative statement of his views. To understand its meaning we must bear in mind that the sumptuousness of Cluniac sanctuaries was considered incompatible with monastic humility. More important than this ethical consideration, however, was a spiritual one. To Bernard the life of the Cistercian cloister—the *paradisus claustralis*—was an image and foretaste of Paradise. He sought to prepare his monks, even while in this life, for the fruition of an ultimate truth which the relatively crude imagery of Romanesque art could never convey.

Its elimination from the Cistercian monastery was therefore inevitable. Significantly, however, music maintained its place. And the disappearance of figurative sculpture and painting from Cistercian churches cleared the way for a purity of proportions that is all the more remarkable in view of the role which sacred architecture played, in the mystical contemplation of the Order, as an image of Heaven. For Bernard, as for Augustine, the perfect consonances, visible or audible, were not delusions of the senses, but echoes of transcendental reality.

We do not yet know all the geometrical modules used by the Cistercian builders. Yet the use of such modules is strikingly obvious in their churches. Augustine's "perfect" ratio 1:2 generally determines the elevation. In the abbey of Fontenay (1130-47), the best surviving example of early Cistercian architecture, this octave ratio determines the proportions of the ground plan as well. Moreover, the bays of the side aisles being of equal length, width, and, up to the stringcourse, height, we obtain in each of these cells a spatial cube—the "geometrical harmony" of Boethius which, later, we also encounter in Chartres. The austere façade, if we include the buttresses and the upper stringcourse, describes a square. The distance between the upper and lower stringcourse is determined "according to true measure." Medieval preference for this proportion appears in a new light if we recall Augustinian preference for the octave and the preoccupation with the octave and with the square in the thought of Augustine on the one hand and of the school of Chartres on the other: the proportion "according to true measure" may be defined as the geometrical expression of the ratio of the octave based on the square as module. It can hardly be a coincidence. Nowhere in Western architecture are the Augustinian consonances as present as they are in the simple and solemn proportions of this Cistercian church. Its design, in any event, is singularly attuned to the musical mysticism of the twelfth century.

Thus we have seen that the use of geometrical formulae in sacred architecture—so emphatically evident and yet so surprising to the modern observer—is rooted in the very world view of the twelfth century. Such interaction between the spheres of thought and of art is, of course, most evident in the case of Cistercian architecture.

But what renders this evidence important in our present context is the close relationship between Cistercian and early Gothic architecture. This relationship has often been described. It would be incorrect to define Gothic as the daughter of Cistercian architecture. In criticizing the art of the Cluniac order, St. Bernard himself had made it very clear that his views as regards religious architecture applied to monastic buildings but not to the secular cathedrals. He readily conceded that the latter, "since they cannot excite the devotion of the carnal populace with spiritual ornaments, must employ material ones," in other words, that cathedral art had to make concessions to sensuous experience which the mystic no longer required. On the other hand, St. Bernard's insistence that all religious art and music must be attuned to spiritual experience, that they are justified only inasmuch as they lead man to ultimate truth, confronted cathedral builders with the same basic challenge which monastic architecture had answered with the creation of the Cistercian style. Cistercian and Gothic may be described as two branches of religious architecture—the one monastic, the other episcopal—growing out of the same basic experience.

There is nothing surprising about this close relationship. St. Bernard was the most forceful exponent of a vision of art, the basic tenets of which had their champions in cathedral schools like that of Chartres. It would indeed be a serious mistake to consider the two intellectual movements we have studied as entirely distinct. The Platonists of Chartres and the Augustinians of Cîteaux and Clairvaux were united by innumerable personal ties as well as by a common heritage. Of particular interest in this connection are the relations between St. Bernard and the three men who commissioned the three monuments with which Gothic art begins: Suger, Abbot of St. Denis, and the Bishops Henry of Sens and Geoffrey of Chartres.

Suger's place in the history of art is mainly due to the importance of the west façade and choir of St. Denis which, for the development of architecture as well as sculpture, mark an epoch. But his fame also rests on the fact that, unlike any other medieval builder, he has, in two treatises, rendered account of the significance of his art and indeed of the spiritual motivations that prompted him to adopt a style the dramatic novelty of which he himself seems to have sensed.

The interpretation of Suger's writings—and of his art as well—has generally suffered from the assumption that "an irreconcilable contrast" existed between his artistic views and those of the Abbot of Clairvaux. In point of fact, Bernard's views were from a twelfth-century viewpoint far less extreme than is usually believed and, as I hope to have shown, offer many points of contact with the esthetic convictions of his contemporaries. Suger in particular, steeped in the neo-Platonism of Pseudo-Dionysius, must have been singularly attracted by Bernard's insistence that religious art is admissible only inasmuch as it guides contemplation toward the transcendental source of all beauty. This thought is the continued theme of Suger's treatises in which he interprets his artistic creations as he believes they ought to be understood. We have no reason to doubt his sincerity in this regard. In fact, there is good reason to think that the art of St. Denis may actually reflect Bernardine influence. The same influence, as I can but mention in passing, may have inspired the building activities of Henry of Sens and Geoffrey of Chartres.

St. Denis, Sens and Chartres West mark a beginning. But the "classical" Gothic cathedrals that follow their lead embody the same metaphysics of beauty. During the second half of the twelfth century the Platonism of Chartres and the spirituality of St. Bernard lose nothing of their influence. On the contrary, this influence is consolidated through a union of the two movements that is often as intimate as is, during the same period, the fusion of Cistercian and Gothic architecture.

This fusion, and its origin in the metaphysics of musical harmony, is most clearly embodied in the work of a professional architect. I have already mentioned the model book of Villard de Honnecourt. One of his designs represents the ground plan of a Cistercian church drawn *ad quadratum*, i.e., the square bay of the side aisles is used as a module, as a measuring unit from which all proportions of the ground plan have been derived. And these proportions, as E. de Bruyne observes, correspond in each case to the ratios of the musical consonances. Thus the length of the church *in opere* is related to the transept in the ratio of the fifth (2:3); the ratio 1:2 determines the relation between side aisle and nave, length and width of the transept, and, we may assume on the basis of Cistercian practice, that of the interior elevation as well. The 3:4 ratio of the choir evokes the musical fourth; the 4:5 ratio of nave and side aisles taken as a unit corresponds to the third, while the crossing, liturgically and esthetically the center of the church, is based on the 1:1 ratio of unison, most perfect of consonances.

Villard's testimony is of great significance. He seems to have received his architectural training at the Cistercian monastery of Vaucelles and certainly was employed as an architect by the Order. His design embodies the esthetic principles of the Cistercian tradition. While it does not seem to represent any church actually built, it shows sufficient resemblances to Pontigny and other churches of the Order to warrant Hahnloser's suggestion that Villard's ground plan was designed as the ideal type of a Cistercian church.

Villard's authority and interest was not confined to

the sphere of monastic architecture. Trained during the first third of the thirteenth century and active during the second, he saw, completed or in the process of building, nearly every one of the classical cathedrals of the Ile de France. He was a distinguished Gothic architect in his own right, and it is all the more significant that, not only in his Cistercian ground plan, but on nearly every page of his model book he stresses the importance of geometry for the realization of harmonical proportion.

But it is the Gothic cathedral itself that bespeaks this artistic conviction. The proportions of the great sanctuaries of the thirteenth century are based on the simple ratios of the musical consonances that also determine Gothic music. This affinity between architecture and music was an esthetic truism to an age which perceived in the "science" of music the all-embracing principle of the universe. Abbot Suger, in the opening passages of his treatise on the consecration of the church, describes the universe as a symphonic composition in terms strikingly similar to those used by Alanus ab Insulis in the passage on the work of the divine architect. Suger invokes this vision as the sublime prototype of the sanctuary he is going to erect. But if his musical phraseology suggests that he considered his architecture a "frozen music," musical writers of the High Middle Ages, conversely, compare musical composition to architecture.

To sum up: the metaphysics of "measure and number" explains the design as well as the symbolic significance of the cathedral and influenced architectural procedure itself. The observation of geometrical canons was imposed by an endeavor that had less to do with artistic invention than with science (as these terms are understood today). Designed in an attempt to reproduce the structure of the universe—not unlike the great scientific experiments of our time in this respect—the cathedral is perhaps best understood as a "model" of the medieval universe. It is the theological transparency of this universe that transformed the model into a symbol.

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1. H. Sedlmayr, *Die Entstehung der Kathedrale*, Zuerich, 1950. See my review in *Kunstchronik*, IV, 1951, pp. 78 ff.

2. The Book of Revelation is neither the only source on which the Middle Ages based their eschatological vision, nor is Gothic architecture a better monumental "illustration" of that source than other styles. The temple of Solomon, especially as described by Ezekiel, probably influenced ecclesiastical symbolism as much as did St. John's description of the Heavenly City. And if a contemporary writer compares the Romanesque *Trinité* of Fécamp to the celestial Jerusalem, the sanctuary evokes for him the splendor of the biblical vision by means very different from those of the Gothic design and yet quite as effective. See V. Mortet, *Recueil de Textes*, I (Paris, 1911), p. 345.

3. See the remarks of F. Bond, *Introd. to Engl. Church Arch.*, I (London, 1913), p. 321 on French and English methods of web filling.

4. See J. Bony, *French Cathedrals* (Boston, 1951), pp. 9 ff., who defines Gothic "functionalism" much as I do.

5. Cf. esp. W. Ueberwasser, "Nach rechtem Maasz," *Jahrb. d. preuss. Kunstslgn.*, 56, 1935, and P. Frankl, "The Secret of The Medieval Masons," *Art Bulletin*, 27, 1945.

6. The most exact measurements of Chartres Cathedral are still those given by Lassus, *Monographie de la Cath. de Chartres* (Paris, 1867). Measurements vary from bay to bay and the proportions given above are but approximations. Variations seem to be due partly to changes of plan and considerations imposed by the earlier building, and partly to the rather crude methods of setting out—by means of pegs and strings—employed by the medieval builder. See now J. Harvey, *The Gothic World* (London, 1950), pp. 16 ff. and L. F. Salzman, *Building in England* (Oxford, 1952), p. 17.

7. *Gothic Architecture and Scholasticism*, Latrobe, 1951, pp. 74 ff.; Panofsky's analysis of the elevation of Chartres is illuminating even if one does not accept the author's interpretation.

8. See O. Kletzl, *Planfragmente aus d.d. Dombauhuette von Prag* (Stuttgart, 1939), pp. 19 f.

9. *Annali della Fabbrica del Duomo di Milano* (Milan, 1877-85), esp. I, pp. 68 ff. and 209 f. The best discussion of the subject is that of J. S. Ackerman, "Ars sine scientia nihil est," *Art Bull.* 31, 1949.

10. The first comprehensive interpretation of the esthetic system inherent in the thought of the school of Chartres we owe to E. de Bruyne, *Études d'Esthétique médiévale* (Bruges, 1946), II, pp. 255 ff.

11. See F. M. Cornford, *Plato's Cosmology* (London, 1948), pp. 59 ff.

12. "The term 'architect' in the Middle Ages," *Speculum*, 17, 1942. On the entire question see now the very sensible remarks of Salzman, *l. c.* pp. 1 ff.

13. See M. F. Bukofzer, "Speculative thinking in medieval music," *Speculum*, 17, 1942, and L. Spitzer, "Classical and Christian ideas of world harmony," *Traditio*, II, 1944, and III, 1945.

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A LOST ROMANESQUE FAÇADE: LA CHARITÉ-SUR-LOIRE

Among the great Cluniac priories La Charité-sur-Loire quickly rose to a position of preeminence. Founded about 1056, it grew rapidly in wealth and position, and before the recession in Cluniac fortunes it had come to have more than two hundred monks and over four hundred dependencies, scattered from Constantinople to Portugal and England. In size, wealth, and place in the hierarchy it was second only to Cluny itself in the order.[1] Due to the fact that much of the most interesting construction at La Charité was either rebuilt, destroyed, or left unfinished it is probably best known because of the controversy over the similarities between some of the portal sculptures and some of those on the Royal Portal at Chartres. This is unfortunate for the church was one of the largest and finest products of Cluniac monasticism. As originally built it was the mature realization of the scheme of the second church at Cluny and a very influential design, but the parts of the building which are still well preserved date from a time when the order of Cluny was no longer in a dominant role. Impressive as they are they stand at the end of a development and are of less interest to most art historians than those contemporary designs which mark the beginnings of the new Gothic style.

The church of La Charité-sur-Loire as it now stands has a fine transept and chevet, incorporating earlier work but given their present character in a twelfth-century rebuilding. There is a stumpy, four-bay nave, rebuilt from ruins after 1695. The façade belongs to the period of the nave. In front of the church there are some fragments of the Romanesque nave and narthex, including one of the intended pair of narthex towers and parts of the narthex façade.[2] The importance of the foundation, the scale and beauty of the fragments, and the confusion resulting from the combination of ruin and rebuilding seemed to justify a study looking to the graphic reconstruction of the building at the various Romanesque stages of development. The most unexpected outcome of that study was the recovery of an early twelfth-century facade, the very existence of which was not known before. Where that façade once stood there are now houses and a courtyard. The materials of which it was built have long since been reused, but the evidence on which the restoration was based seems clear enough to justify presenting what must have been a worthy rival of even the great nave façade at Cluny.

There have been several suggestions with regard to the Romanesque nave of the church at La Charité. There is room for ten bays between the transept and the ruined west wall and there is evidence of several changes of style in the preserved remains of those bays.[3] From the time of Viollet-le-Duc it has been often assumed that the total length was divided between a nave and a narthex. An eight-bay nave and two bays of narthex is one suggestion.[4] M. Beaussart, who has made the most careful and complete published study of the building, reluctantly settled on a four-bay nave and six-bay narthex, with a good possibility that there may never have been more than a temporary wall breaking the length and that consequently the building really had a ten-bay nave and no narthex at all.[5] The most recent study of the church states this theory as a fact.[6]

It is not necessary to review all the details of the restoration of the nave in order to establish the existence, location, and probable date of the nave façade, but a summary of the evidence will be useful.[7] The nave was begun at the transept with round-headed arches in the main arcade. There are two such arches on either side. Then a shift was made to pointed arches which were used for the rest of the nave and the narthex. There is enough left at the triforium level to indicate three distinct styles. The first four bays (from the transept) were alike and quite different from the next three. There are then one bay where no evidence with regard to the triforium is preserved and the two western bays in a different and later style. The only sections of the clearstory still in place are against the tower at the western end. M. Beaussart rightly dismissed the possibility that the church had had an eight-bay nave and two-bay narthex any time after the present western bays were built. There is a

highly irregular pier at that division point at which corrections were made both in level and axis to line up the two front bays with the rest of the church (Fig. 1). The pier as it stands cannot be later than the other parts of the two western bays and is certainly not a recut fragment of a façade. Excavations have uncovered lateral foundations at that point which have been considered evidence that there may have been a wall there at one time, presumably removed and the nave lengthened in the twelfth century.[8] It seems more probable that what was uncovered was part of a foundation grid, for one factor in the irregularity of the pier in question is that it is conceived as a buttress for the western tower. The only suggested alternative to a ten-bay nave, from the twelfth century on, is that there could have been a four-bay nave and six-bay narthex. This is highly improbable. It makes the nave too short for the chevet and the narthex too long in proportion to the nave. A study of the eighteenth-century façade throws further doubt on such a theory, for it is certainly not a repaired and reworked piece of Romanesque (Fig. 2).

For some reason no one has suggested a façade at the one point where it is neither impossible nor improbable; where it would give the building a seven-bay nave and a three-bay narthex. The very numbers have an authentic ring and everything about the building agrees. The original plan at La Charité was based on that of the second church at Cluny which had a seven-bay nave and a three-bay narthex. The irregular pier back of the western tower makes good sense, for in preparing to connect a new narthex structure to a façade one bay farther east, that is precisely where necessary corrections of axis and level would be discovered and made. And at the point where the façade would have been? Nothing! That is less discouraging than it might seem, for the façade, if it existed, was doubtless the heaviest wall in the building and the most valuable for salvage. It would also be the most dangerous to leave standing when, at the rebuilding of 1695, the nave bays behind it were definitely abandoned. There are houses now in the remains of the north side aisles and except at that one point there are very considerable remains of the piers, arches, and triforium. Where the façade should be, a door and a row of windows bear witness to the fact that the masonry, whatever it was, is gone (Fig. 1).

As a large Cluniac church, La Charité should have had a narthex and consequently a more or less elaborate façade separating it from the nave. At the third church at Cluny the nave façade was a complete composition which stood free for some time before the narthex, intended from the beginning, was actually built.[9] The westernmost bays at La Charité are unquestionably later and different in style from those nearer the transept. They were apparently built from west to east with adjustments made two bays east of the west wall to line them up with preexisting work. The most probable explanation of such a development is that the same thing was done at La Charité as at the mother house. First the nave, seven bays long in this case, was completed façade and all. Then at a later date a narthex was built, or begun, to complete the scheme. There is other good evidence for believing that the monks at La Charité had an adequate nave complete with façade, for there is every reason to doubt that the narthex was ever much more complete than it is today.[10] The lower part of the west wall was built along with the northwest tower and the north aisles, but apparently the rebuilding of the transepts and chevet was given precedence over the completion of the narthex and, except for tentative starts at altering and completing it in the Gothic style, that was the end.

After many fires and scenes of violence through which the church came relatively whole, it suffered from a terrific conflagration in the year 1559. Most of the monastery and much of the town were destroyed and from that time until rebuilding was undertaken in 1695 the nave of the church was left in ruins. There are engraved views of the monastery and town made in 1640 by C. Chastillon and in 1650 by Israël Sylvestre.[11] The Sylvestre engraving has been available to me only in engraved copies, but after making all due allowance for artistic license, copy errors, and the fact that the artists were making topographic views rather than pictures of the church, there still can be no question that in each of these pictures there appears between the front tower and the crossing a structure that can only be the old nave façade (Fig. 3). The size, shape, and location make it impossible for it to be anything else. The Sylvestre copies even indicate the exact location, two bays back of the tower and seven bays west of the transept.

The existence and location of the nave façade being established, an attempt was made to find out as much about it as possible. Since it was still in place in 1650 but is never reported after that date it is probable that the materials were salvaged and reused in the rebuilding of the present nave and façade. Excavation in the courtyard might turn up evidence but there is a strong possibility that while they were salvaging material they took it all, including much of the foundation. The scale and general shape of the façade are set by those of the nave of the church, and the five-aisle plan could be expected to have some expression on the front of the building. The fact that the narthex was also planned with double side aisles suggests the probability that the main inner portal was flanked by pairs of doors. The engravings add some important information. The most striking feature of the inner façade, from a distance, was a very large window set in a big arch. Some kind of opening,

FIG. 1. Remains of Narthex and Nave, La Charité-sur-Loire.
(A. Kingsley Porter Collection.)

FIG. 2. Façade, La Charité-sur-Loire.
(A. Kingsley Porter Collection.)

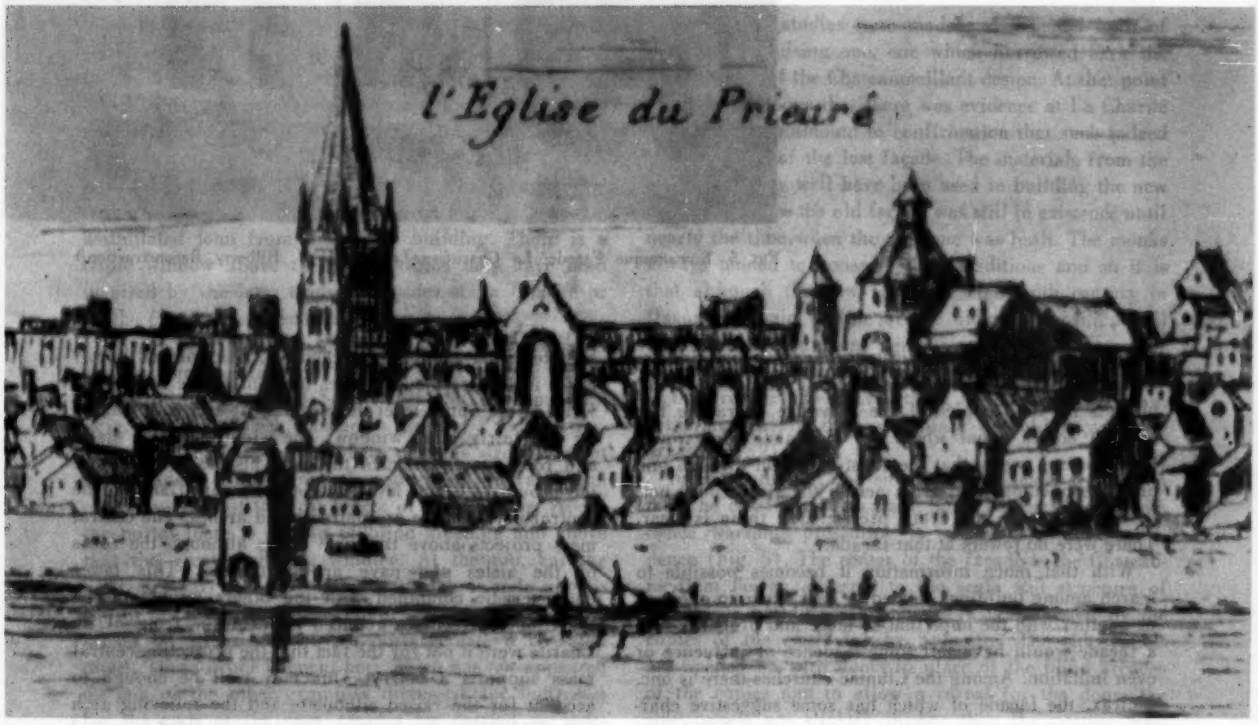

FIG. 3. Detail of Sylvestre View (1650). (Amédée Jullien, *La Nièvre à travers le passe*, Nevers: Michot, 1883.)

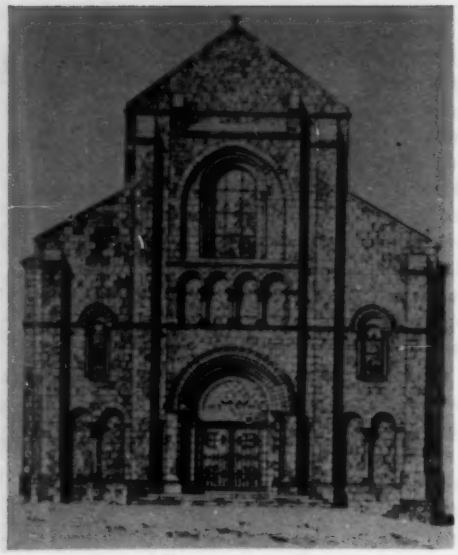

FIG. 4. St. Genès at Chateaumeillant. (A. de Baudot and A. Perrault-Dabot, *Archives de la Commission des monuments historique.*)

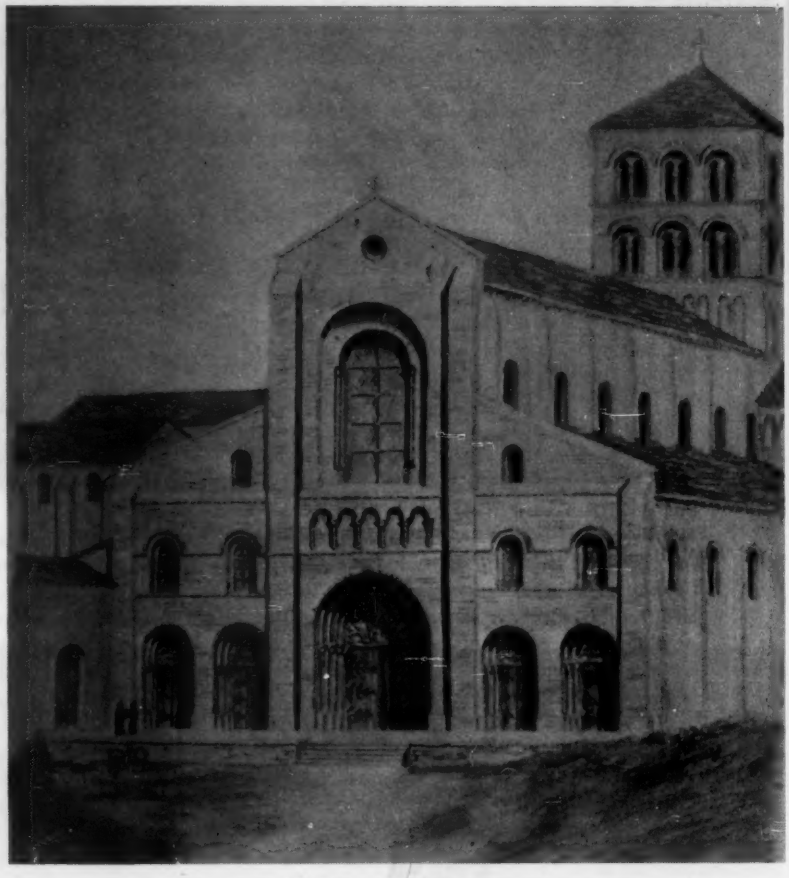

FIG. 5. Romanesque Façade, La Charité-sur-Loire. (H. H. Hilberry Reconstruction.)

perhaps a bull's-eye, is indicated above the big window. The lower side element of the façade looks like a flying buttress on both copies of the Sylvestre engraving but since it comes about where the side aisle roof would have to be, it seems that the artist saw light through one or more openings and from across the river could not, or did not, make the detail precise. One thing is clear. There were no towers at that façade.

With that much information it becomes possible to search among buildings related to La Charité in one way or another with the hope that so large and probably rich a façade would have left some evidence of influence or even imitation. Among the Cluniac churches there is one, Moirax, the façade of which has some suggestive characteristics.[12] It is a small church compared to La Charité and in general quite dissimilar. The façade however has an interesting grouping of elements. The splayed portal is set in a mass that advances in front of the rest of the wall. At the upper level there is a great arch and framed by it a fairly large window. The windows to the aisles and roof spaces indicate the three-aisle scheme of the nave, but at ground level, instead of doors flanking the central portal, there are paired blind arches. The central mass projects above the aisle wings although the roofs of the aisles and nave are continuous. This latter characteristic combined with the others might suggest that this represents a reduced copy of the front of La Charité were it not for the fact that the projecting central mass supports a belfry. This may well be enough to account for the raised silhouette and the relieving arch below, leaving only the five-arched pattern of the ground level to suggest La Charité. Moirax then may or may not

reflect the lost design and can be considered only with great caution.

Among the priory and parish churches once belonging to La Charité there are many destroyed, unidentified, or otherwise not accounted for, but among the few that are known there is the church of Saint-Julien at Osmery. It is a small church with an aisleless nave and a wooden vault so it can hardly be expected that much would be done in imitation of the great church. I have no photographs of the façade but the description is very interesting.

> La façade occidentale est pleine d'élegance: son portail en plein cintre, ouvert dans un avant-corps surmonté d'un glacis que soutiennent de petits arcs placés sur des corbelets à masques, entoure de ses deux rouleaux surmonté de dents de scie un tympan nu au-dessus de deux pilastres. De chaque côté, deux arcades aveugles en pléin cintre encadrent la porte.[13]

Here again there are suggestive details and this time nearby and directly under the control of the monks of La Charité.

The church at Chézal-Benoit did not belong to La Charité, but its patron-founder later became the prior of La Charité and the plan and chevet seem to have been much reduced versions of the great priory church. The façade at Chézal-Benoit is apparently later than the lifetime of the founder but there were these traditional and architectural links between the two.[14] The façade at Chézal-Benoit is not elegant but again in the lower part there is the motif of a central door set in an advancing panel and flanked by pairs of blind arches. In this case the blind arch motif is also slightly advanced in front of the wall, and ear-like buttresses continue up the wall from the central panel.[15] Considering the relationship of other parts of the building to La Charité and the unhappy relationship of the parts of this façade it is tempting to suspect that this five-arch motif is a poorly assimilated loan from the larger building. There is a triple window above the portal which may have been inspired by the later transept façades at La Charité or by the planned narthex façade there.

The most interesting of the façades which seem to suggest some relationship to the lost La Charité design is that of the church of Saint-Genès at Chateaumeillant (Fig. 4). This church constantly suggests a reduced version of La Charité and nowhere quite as strongly as at the façade.[16] Here again the advanced central panel carries up almost the full height of the building. Above the portal there is a band of blind arcading and above that the great arch and window. At the top, ear-like buttresses carry on up the wall. The three-aisle plan is shown in the aisle windows but at the lower level paired arches on either side of the portal create a five-arch motif. There is one element here which has not appeared on any of the other examples discussed, the buttresses for the ends of the nave arcades are carried up independently of the central panel. This separation of elements is important for it was done at the cost of considerable trouble and in spite of the fact that it did not naturally fit the church. In order not to pinch the central panel and allow room for this separation of the panel and buttresses it was necessary to adjust the nave to the façade and not vice versa. The western bay of the nave widens toward the façade and even then the buttresses are placed slightly outside of perfect alignment with the walls in order to get the desired breadth.[17] At La Charité the great size of the building makes this motif natural but at Chateaumeillant it is forced and apparently due to a desire to copy a design too large for the scale of the building. At Chateaumeillant there appears to be no logical necessity for the separation of the central façade panel from the buttresses at each side but at La Charité there was a very good reason for such an arrangement. From the beginning the design at La Charité would be planned with a narthex in mind. The narthex probably was begun very shortly after the nave and façade were finished and the intentions of the builders are clear. The central vessel of the narthex was to be as wide and high as the nave. By treating the whole center of the inner façade as an isolated design it was possible to plan for the narthex walls to join the buttresses at the ends of the nave walls and still leave the central unit free and unspoiled.

Restoration studies were made and a model built of the most promising one, one which borrowed back the whole center of the Chateaumeillant design. At that point it became obvious that there was evidence at La Charité so strong as to amount to confirmation that such indeed was the form of the lost façade. The materials from the old façade may well have been used in building the new one. In any case the old façade was still in existence until nearly the time when the new one was built. The monks always tended to conserve their traditions and so it is that although the new façade is eighteenth century in flavor the main outline of the older composition still makes itself felt. Here again is the projecting center panel disengaged from its flanking buttresses. Here again is the great window. Everything has changed in detail, yet translated in time and place the old façade still exists (Fig. 2).

In the nature of the situation the façade restoration must be considered schematic but I believe that the evidence warrants presenting it with considerable confidence (Fig. 5). The center of the façade is the Chateaumeillant design adjusted to the scale and structure of the larger building. The bull's-eye is suggested by the copies of the engraving by Sylvestre. The side panels are opened up with doors in place of the blind arcades of the copies and to allow a reveal for the doors the side panels are slightly thicker than the normal wall thickness, a suggestion from Chézal-Benoit. There would

certainly be aisle windows above the doors and the five-aisle plan demands two windows on each side. The opening into the roof space is suggested by Moirax and by the engravings. It is needed for ventilation, improves the looks of the façade, and is a necessary part of the circulation scheme of the church when the narthex is built. The parapets are similar to those at Chateaumeillant and Moirax.

In the face of lack of evidence the decoration as shown was intended to be ambiguous enough to be interpreted as either painting or sculpture, more probably the former. The sculpture of La Charité presents a series of interesting and difficult problems which lie beyond the scope of this study. It is not impossible that the figures of Christ and some of the apostles now set in the arcade above the south choir clearstory were originally made to go in the blind arcade above this central portal. If so, the portal tympana may have been bare and the arrangement of the blind arcading slightly different. It is also possible that the tympanum of the northernmost door of the narthex façade was made for one of the inner side portals. It was not originally cut for a door quite as large as the one where it now is, for in order to fit it to the present arch it was necessary to piece it out on both sides.[18] Considering the builders, it can be assumed safely that this must have been one of the most impressive of the great Romanesque façades, whatever the decorative enrichment.

There is one other question which may well be raised, the date. There is no general agreement about dates at La Charité except that it is accepted that the earliest parts of the transepts and east end belong to the church begun under the first prior and dedicated in 1107.[19] There was a burial at the steps of the altar, presumably the high altar and at the crossing, in 1076. With the third bay west of the transepts the builders adopted the pointed arch for the main arches of the nave arcade. The date of 1088 is important in this connection for it marks the beginning of the great third church at Cluny where such arches were used consistently for the first time in a French church. It is interesting, if futile, to wonder why only two arches of the nave arcade were built between 1076 and 1088 but the masons at La Charité may have been busy with conventual buildings or preparing the foundations for the whole nave. At any rate, it seems probable that the adoption of the pointed arch comes shortly after 1088. That would leave a period of nearly nineteen years for the building of five bays of the nave and the façade before the dedication in 1107. The monastery was very prosperous during these years and I can see no reason to doubt that the nave and façade were effectively finished by the dedication date. In any case, with the great amount of twelfth-century building and rebuilding subsequently done at La Charité it is safe to say that this project was finished early in the century and when completed had few peers among Romanesque church fronts.

SYRACUSE UNIVERSITY

1. The most complete review of the history of the monastery is in Pierre Beaussart, "L'Église Benedictine de La Charité-sur-Loire, Fille Ainée de Cluny" (La Charité-sur-Loire: A. Delayance, 1929), pp. 13-31. For the early history and dates particularly important to the history of the building there is, Harry H. Hilberry, "La Charité-sur-Loire, Priory Church: A Reconstruction Study" (Ph.D. dissertation, Harvard University, 1948).

2. There are four published studies which deal with the church at La Charité at some length:
Beaussart, *op. cit.*,
André Philippe, "L'Église de La Charité-sur-Loire (Nièvre)," *Bulletin Monumental* (1905).
Louis Serbat, "La Charité-sur-Loire," *Congrès Archéologique* (Paris: Picard, 1913).
M. Anfray, "L'Architecture religieuse du Nivernais au moyen age," *Les Églises romanes* (Paris: Éditions A. et J. Picard et Cie., 1951) pp. 62-98.

3. Philippe, *op. cit.*, p. 476, says there are eleven and Anfray, *op. cit.*, p. 67, fig. 5, reproduces a plan showing eleven, but both are wrong.

4. Serbat, *op. cit.*, p. 380.

5. Beaussart, *op. cit.*, p. 143.

6. Anfray, *op. cit.*, pp. 67-68.

7. For a more complete study of the nave see Hilberry, *op. cit.*, pp. 75-100.

8. Beaussart, *loc. cit.*, and Anfray, *loc. cit.*

9. Kenneth John Conant, *A Brief Commentary on Mediaeval Church Architecture with Especial Reference to Lost Monuments* (Baltimore, Johns Hopkins Press, 1942). Plate XLIII shows the great church at that stage.

10. Hilberry, *op. cit.*, pp. 118-126.

11. Engraved copies of both engravings appear in Amédée Jullien, *La Nièvre à travers le passe* (Nevers: Michot, 1883), p. 180. The Sylvestre engraving is also copied in *Topographia Galliae* (Francfurti: Gasparum Merianum, 1656), pp. 11-12.

12. Joan Evans, *The Romanesque Architecture of the Order of Cluny* (Cambridge, University Press, 1938), Fig. 189.

13. François Deshoulieres, *Cher, Les Églises de France* (Paris, Librairie Letouzey at Ané, 1932), p. 190.

14. Hilberry, *op. cit.*, pp. 71-73, and 105-106.

15. Deshoulieres, *op. cit.*, p. 102, discussion and picture.

16. Hilberry, *op. cit.*, pp. 66, 73.

17. The plan is included on plate 33 of A. de Baudot and A. Perrault-Dabot, *Archives de la Commission des monuments historique* (Paris: Henri Laurens, Charles Schmid, n.d.) T. IV.

18. The problems of the sculpture at La Charité are the subject of a research project recently begun by Hugo Lutz, sculptor and art historian of Syracuse, New York. It is hoped that in time his findings will clarify many of these details.

19. The problems are discussed in some detail by M. Beaussart, M. Anfray and Hilberry in the works cited.

AMERICAN NOTES

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EARLY ARCHITECTS OF INDEPENDENCE HALL

EDMUND WOOLLEY

The *Votes of Assembly* of the Pennsylvania colonial legislature records that in 1732 Andrew Hamilton, Speaker, "produced a Draught of the State-house, containing the Plan and Elevation of that Building; which being viewed and examined by the several members, was approved by the House."[1] A little later there was dissension in the committee, which also included Dr. John Kearsley and Thomas Lawrence, and it was deposed that:

. . . the said *Andrew Hamilton* exhibited to the two Gentlemen concerned with him for carrying on the said Work, a Plan and Elevation of a House or Building, and the same was compared with several other Plans and Elevations, one or more of which were produced by one of the Gentlemen joined in the said Undertaking; and that at least the Plan and Elevation of the Building now erected for the Representatives of the Freemen of this Province to meet and sit in, and for holding the Supreme Court, was not only agreed upon as the least expensive, but also as the most neat and commodious, by the Persons entrusted to build the same, but likewise approved of by the then House of Representatives; whereupon the said *Andrew Hamilton*, (the Gentlemen employed with him for carrying on the Work declining to attend) proceeded to purchase Materials, and, with the Approbation of the several Assemblies that have been held annually, hath carried on the principal Building, with the Offices, at considerable Length;[2]. . .

It has become a tradition that Hamilton, a lawyer, designed the building. Around the year 1890 an unsigned drawing on a sheet of parchment about 13″ x 28½″ was discovered among the papers of John Dickinson which seemed to be, and probably was, an early study for the design of the structure—perhaps even the one shown the Assembly.[3] The drawing (dated 1732 in a small panel above the central entrance door) represents the main block of the structure pretty much as built.[4] Because parchment was a common item of stationery around a lawyer's office in that day, this seemed to some to clinch the argument that Hamilton made the drawing and was the *Architect* of the building.

A recent gift to the National Park Service of photographs and notes collected by Horace Wells Sellers (1857-1933)[5] contained a photocopy record of payment to Edward Woolley, Philadelphia master carpenter, for what appears to be the working drawings for the State House:

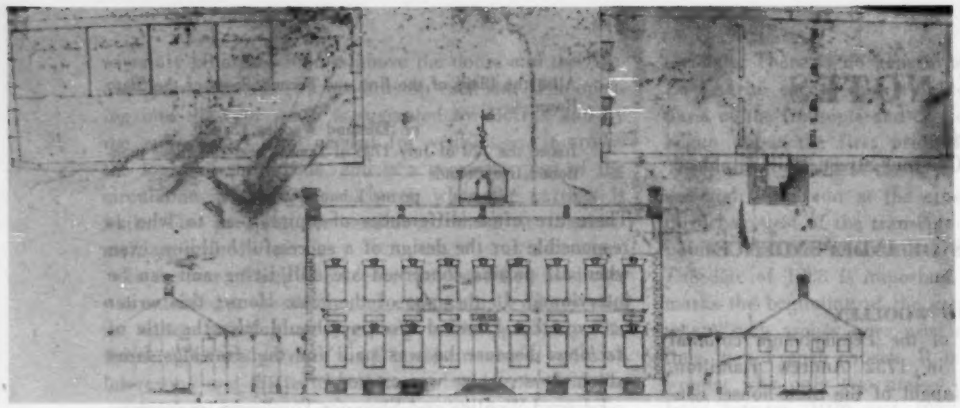
1735 The Honourable John Penn Esquier Dr.
To drawing the Elivation of the Frount one End the Roof Balconey Chimneys and Torret [turret] of the State House With the fronts and Plans of the Two offiscis And Piazzas Allso the Plans of the first and Second floors of the State House
pr. Edmund Woolley £5/0/0
Receed the 22d of July 1736 of James Steel the above mentioned five Pounds — — — —
pr me Edmund Woolley[6]

There are often differences of opinion as to who is responsible for the design of a successful building, even when all parties concerned are still living and can be interviewed. In the case of the State House, this writer believes that Edmund Woolley should have the title of *Architect* because he was paid for the drawings from which the structure was erected.[7]

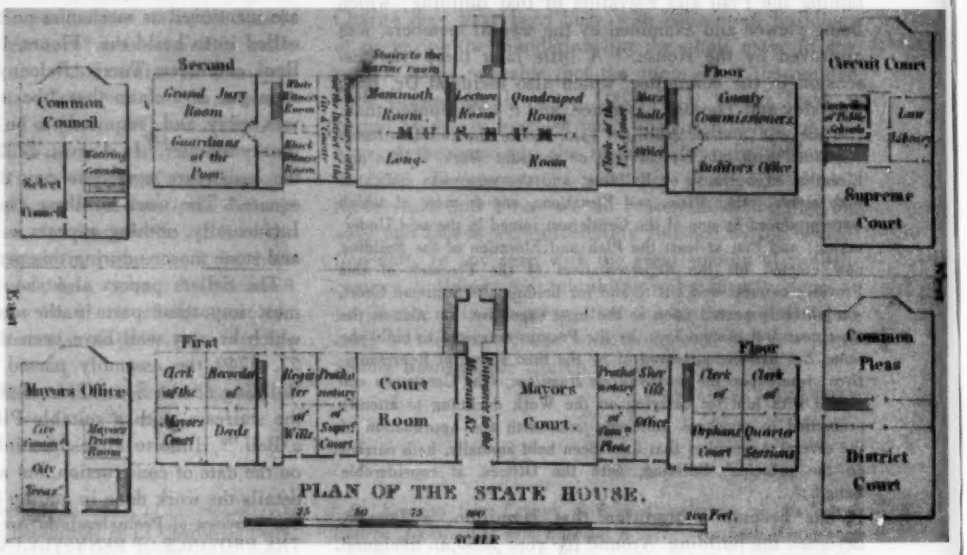
Edmund Woolley and Ebenezer Tomlinson, carpenters, are mentioned as mechanics on this project, having been called in to build the "Floors, Outside Windows, Doors, Roof and Eves, Turret, Balcony, and the Stairs." They soon put in a claim that "the work expected from them was heavy, and [required] to be carried on in an extraordinary Manner." In August, 1732, after some negotiation, the legislature agreed to pay them thirty shillings per square.[8] The work of these two continued until 1740. Incidentally, nothing appears as to the work of the brick and stone masons during this period.

The Sellers papers also show that Woolley played a most important part in the erection of the tower, of which he may well have been the designer. On January 27, 1749 the assembly passed an Act authorizing "a Building on the South Side of the said House to contain the staircase, with a suitable Place thereon for hanging a Bell."[9] Hitherto almost no information was available on the date of construction, but a long report by Woolley details the work done in adding the tower as follows:

The Province of Pennsylvania in Account with Edmund Woolley
THE PROVINCE OF PENNSYLVANIA Dr. To Edm.d Woolley.—
To Work done at the State house, Viz.t drawing drafts, Bills of Scantling, taking an Account of all the Timber & reducing the same to Superficial Measure, also taking an Account of all the Plank & Boards used for the State house. To making 3 round & 3 half round Centers for Windows & doors; Cutting away the Old roof & floor in order to build the tower Wall on the State house wall; making Scaffolds to ye tower in Side & Out, for My Self, Bricklayers Plaisterers & Painters; pulling down the Old Turret & making good the State house roof when it stood & a Large dormand between State house & tower Wall, & Shingling against S. wall; altering the Balconey & adding thereto with Stairs leading to State house flat; getting the Bell up & down & up again & twice hanging Bells; Jointing Many thousand of Shingles; making a Scaffold the whole length of the State house, to paint ye Eves, front windows &c. & strikeing ye Same again; Making many drawers & cases for ye Same in ye Loan Office; hanging ye upper front Sashes anew in long Gallery; Time Spent in attending the Clock makers while fixing ye Clock ye first time, many of the above Articles not now to be Seen. To building ye Committee room together with the Bookcases, table, the Entry & all other Wood Work as it now stands. Also the Entry Hall of the State house as its now finished: The Stair Case & Stairs & the rest of ye work belonging to the tower as now finished both out & inside from the Vane to the foundation. Also ye Portal at ye head of ye



The Parchment Plan for the Pennsylvania State House dated 1732. Unsigned but attributed to Andrew Hamilton. (Courtesy Historical Society of Pennsylvania)



Floor Plan, 1824, showing Robert Mills' wings and the rooms of Peale's Museum.

first Stairs with ye ramp & twist Stair, carried up there with all ye Other Work therein Contain'd as now to be Seen—With many Other Jobs not here mentioned for all which Work My Charge is as follows.....[10]

Examination of the account following shows that the stone foundation of the tower was built and completed in the year 1750. In December work closed down for the winter and the project was laid away with a libation of liquor. Work was resumed again at the beginning of April, 1751 (more liquor) and it would seem that the framing of the steeple was completed that fall, for there were "expenses at raisings." In 1752 the bell, just arrived from London, was cracked and it was not until 1753 that it could be recast in Philadelphia and the installation successfully completed with "Victuals & drink 4 days . . . at ye hanging ye Bell."[11] Work on the interior of the tower and supplementary projects seem to have gone on through September of 1756. The bookkeeping details are not clear to this writer, but Woolley received over a thousand pounds altogether for labor out of which he paid his colleagues. Woolley himself received from 5/6 to 6 s. per day, the highest wage of any single individual.

ROBERT MILLS

The work of Robert Mills in Philadelphia—and on Independence Hall in particular—has remained very obscure. The young architect is said to have arrived in the city in 1807.[12] About four years later, when it was proposed to replace the original wings of the Hall with fireproof structures, a printed petition, signed by nearly six hundred persons (including Mills) was circulated. The text of this item, reproduced here in full, explains the purpose of the project:

To the Senate, and House of Representatives, of the Commonwealth of Pennsylvania.

The Subscribers, citizens of the city and county of Philadelphia, respectfully represent,

THAT the public offices for the city and county of Philadelphia now are and for several years have been kept in the small buildings attached as wings to the State House in that city; That from

the want of proper precautions against fire in the erection of those offices, the records and public papers of the city and county of Philadelphia, and those relating to the county of Montgomery prior to its separation from Philadelphia, are exposed to constant hazard. When your memorialists consider the extent and value of the property, the evidences of the title of which are contained in those offices; property not restricted as to its owners, or its locality, but held by persons in distant places, and situated in various parts of the state; and sometimes in other states: When they consider the immense distress and confusion which would result from their loss; they cannot contemplate their present insecure and hazardous situation without much alarm and apprehension.

Your memorialists further represent that those buildings, in their present situation, are inconvenient, unsightly, exposed to improper uses, and disgraceful to the venerable edifice to which they are attached. When it is recollected to what important, dignified and useful services that edifice has been devoted; that in it the fathers of Pennsylvania in its early days laid the foundation of its present prosperity and grandeur; that in it was assembled the first general confederated congress; that in it was adopted the memorable declaration of independence; and that in it were devised those measures which have so happily eventuated in the permanent freedom and happiness of the nation: When such have been the distinguished uses to which this venerable fabric has been devoted, to preserve, to improve and to adorn it must be as grateful to the feelings as it is obligatory on the duty of the citizens.

Connected with the State House is the well known Museum of Mr. Peale, an establishment dear to science, useful to the arts, and reflecting honour on the state in which it exists. The legislature of Pennsylvania, in the fostering hand which they have on several occasions extended to this institution, have evinced their desire to advance the interests of science and the arts; and influenced by this motive, some years since granted to Mr. Peale the use of certain parts of the State House for its reception and arrangement. Under this patronage, and by the activity and zeal of its proprietor, it has so increased that the rooms in which it is contained are not sufficiently spacious for its full display, or to render it as useful as a greater extension would make it.

It is therefore the wish of your memorialists that the buildings in which the offices are at present contained, may be removed; that there may be erected in their stead others which shall form an elegant addition to the State House, afford convenient and fireproof offices for the records and public papers, and the upper part of which may at the same time allow sufficient accommodations for the full display and arrangement of the Museum.

Your memorialists therefore pray that their county commissioners may be authorized and directed at the expense of the city and county of Philadelphia, to remove the present wings of the State House and erect in their stead such buildings as may correspond with the objects of this memorial.[13]

The work was actually executed and the wings remained until the restoration of 1897.

According to one of Philadelphia's most dependable historians, Mills also

. . . proposed very material improvements to the main building, among which were the following: The restoration of the steeple, and changing the site of the clock—the hands of which were displayed at the east and west gables—to show at the front of the building. He projected a portico at the front entrance, which was to be crowned with a balustrade inclosing a rostrum for public speaking; the two blank windows which were nearest the door were proposed to be removed, and in their place were to be made niches for the reception of the statues of Wisdom and Justice.[14]

The drawings and other papers connected with these projects have completely disappeared. It seems fortunate that Mills' proposal was not carried out.

JOHN HAVILAND

Philadelphia architect William Strickland, as is well known, designed the present steeple on Independence Hall to replace the original which had failed structurally nearly fifty years earlier.[15] That John Haviland submitted a competing plan is a recent discovery. Haviland papers —existing in England in the Somerset Record Office, Taunton—were first reported in *JSAH* for October, 1951, 32. Six separate documents were kindly transcribed from a calf-bound volume endorsed "Specifications Agreements & Memorandums" and sent over by the County Archivist, I. P. Collis. One of these is Haviland's estimate for a new steeple according to plans which were rejected in favor of his rival's:

Philada March 7th 1828

An estimate of the cost of erecting a Spire to the State House similar in features and dimensions to the old one as represented in the Accompanying drawings and constructing the same one hundred and twenty four feet high with the necessary platforms and floors for the support of the Bell and clock, also a calculation of the expence necessary to complete the design agreeably to a suggested improvement taking down the present upper stories of the Turret as low as the eaves of the roof of the State House and rebuild them two feet 3 inches in thickness as high as expressed on the drawings to support the Bell and Clock and thereon to erect a wooden superstructure faithfully copying in features and proportions the original Spire and its finish.

The Spire by this last plan would be one hundred and sixty feet high and afford a very desirable support and situation for the Bell and Clock and show to greater advantage the excellent proportions and character of the original Cupola.

The work is calculated to be executed of the best materials of their several kinds and in the most approved manner and finished in every respect conformable to the Proportions and features expressed in the drawings, and printed and gilt in the most desirable manner.

Estimate	$
Cost of rebuilding the Cupola simply as it originally stood	4.600
Extra cost of raising as specified above	4.000
Estimate of the Bell and Clock	3.400
	$12.000

(Signed) John Haviland Archt

A more important item, because the plans *were* executed was the project for the restoration of the Assembly Chamber, scene of the signing of the Declaration of Independence. During the Revolutionary War Independence Hall received hard usage which required drastic repairs. The interiors had to be repaired and there were more changes, as John Binns indignantly recalled:

. . . It is not forgotten that, some thirty years ago the floor, and the heavy, old-fashioned cornice of that sacred hall, to give a job to one of our commissioner's relatives were torn up and torn down, and cut and sawed and broken to pieces, many of which were sold at high prices as relics, and not a pen was moved in reprobation

of the sacreligious outrage by any editor of any public journal, save only by him who is now committing his recollections to paper.[16]

Haviland's connection with the interior restoration (or remodelling) was noticed by the press early in 1830, when repairs and renovations of the second floor were being made for the accommodation of the United States Court.[17] In the following year a letter to the editor signed "Philadelphia" indicates that the improvements had extended to the Assembly Chamber itself:

I visited the Hall of Independence a few days since and, seeing it in confusion, after inquiring the cause, I ascertained that, under the direction of a committee of the Councils of the city, it was undergoing repairs in order to render the appearance similar to that which it bore when our ancestors there assembled on the 4th of July, 1776. On the east end of the room, fronting the entrance to the room on the west, it is proposed to fix, in a place set apart for that purpose, the Declaration of Independence with the fac similes of the signers painted on canvas.[18]

A draft of an undated letter from the architect quoted herewith gives an idea of what was intended.

Thos. Kittera Esqr.

Sir

In compliance with your request I have examined the Hall of Declaration of Independance with a view of reinstating it with its original Architectural embellishment from the best information I can obtain it appears that the Mayors Court room resembles in its general finish and expression its corresponding room the Hall of Independance there was a gallery supported by small columns on the western side together with a Chair and its minor embellishments on the eastern side the exact detail and proportions I find it impossible to obtain either from recollection or drawings of sufficient authority to recommend their reinstatement, the materials we have are in good taste and corresponding with the Architecture of the Vestibule & Stairway and occupies nearly the whole finish the lost part are so trifling and inconsiderable that although it might add a feature that would complete the portrait it would only encumber the room with a useless and defective member.

Your subscriber therefore respectfully recommends the reinstating the room with the general finish of pila(s)ters entablatures—pedestals and dressing of Windows similar to the contour and proportions and style of the Mayors room and Vestibule which was the original finish of the room at the period of the Declaration of Independence.

Your subscriber further reports that the estimated cost of the before described alterations would be about one thousand dollars complete

respectfully Sir
Your M'
John Haviland[19]

• • •

These notes do not solve all the problems concerned with the physical fabric of Independence Hall—in fact, they give rise to new ones. The intention here is to announce the existence of some of the new source material. It will be necessary to do considerable rewriting of the standard histories.

There were at least five major restorations of this building within one hundred and fifty years after the Revolutionary War. The building, though still attractive, is a veritable jungle, archaeologically speaking. Our thanks go out again to Horace Wells Sellers, who made such a valuable collection and probably knew the building better than anyone since Edmund Woolley himself.

1. *Pennsylvania Archives, Eighth Series* (Harrisburg, 1931), Vol. III, 2154.
2. *Ibid.*, 2213, 4 (January 18, 1733/4). The building was variously called State House, Stadt-House and Province Hall.
3. Frank M. Etting, *An Historical Account of the Old State House* (2d ed.; Philadelphia, 1891), 191.
4. The wings—as actually erected in the 1730's and joined to the main structure by arcades or "piazzas" in the 1740's—did not follow the Parchment Plan.
5. Donated by Lester Hoadley Sellers, A. I. A., of Radnor, Pa.
6. Afterwards identified at the Historical Society of Pennsylvania (HSP), as Penn MSS, Vol. I, Accounts, 32.
7. Not much is known of Woolley. Joseph Jackson gave his life span as 1696-1771 without citing his sources.
8. *Archives*, III: 2155, 2195, 2233, 2245, 2260, 2264, 2265, 2337, 2604, 2605, IV:3144. The turret mentioned was evidently the one shown on the Parchment Plan. It stood on the flat of the roof and held a bell. The "balcony" presumably was an exterior feature on the south front used for addressing the people in the Yard which disappeared when the tower was added on that side.
9. *Archives*, 3316.
10. Original contained in *HSP, Norris Papers (MSS), Miscellaneous Accounts, Small Account Books.*
11. The entertainment bill "for raising the Bell Frame and putting up the Bell" dated April 17, 1753 is itemized in *Etting*, 30.
12. H. M. Pierce Gallagher, *Robert Mills* (New York, 1935), 12.
13. HSP, *Stauffer Collection*, XIV, 991. The Sellers Collection has a photocopy of the first page of a printed legislative bill (No. 216., Feb. 14, 1811), otherwise unknown. The bill passed March 24, 1812. *Laws of the Commonwealth of Pennsylvania* (Philadelphia, 1812), V, pp. 340, 341.
14. *Stauffer Collection* (Text by Thompson Westcott) XXX, 2393. The source of this information is not cited.
15. Agnes Addison Gilchrist, *William Strickland* (Philadelphia, 1950), 78, 79.
16. *Recollections of the Life of John Binns* (Philadelphia, 1854).
17. Poulson's *Advertiser*, February 25, 1830.
18. *Ibid.*, October 8, 1831.
19. *Haviland MSS*, as above. These papers have recently been placed on deposit at the University of Pennsylvania Library, where they can be consulted.

FRANKLIN ON FRONTIER PLANNING, 1787

Benjamin Franklin was perhaps the most observant and well-informed American of his time. The method of laying out New England towns for their better defense—as described in the following letter to Samuel Elbert, Governor of Georgia—is a new one to us. Can any of our readers identify examples?

Philada. Dec. 16, 1787

Sir,

I received by Mr. Dromgoole the Letter your Excelly did me the Honour of writing to me the 2d of November past, and am much concern'd to hear that a War between the State of Georgia and the Creek Indians was unavoidable.

During the Course of a long Life in which I have made Observations on public affairs, it has appear'd to me that almost every War between the Indians and Whites has been occasion'd by some Injustice of the latter towards the former. It is indeed extremely

imprudent in us to quarrel with them for their Lands, as they are generally willing to sell, and sell such good Bargains: And a War with them is so mischievous to us, in unsettling frequently a great Part of our Frontier, & reducing the Inhabitants to Poverty and Distress, and is besides so expensive that it is much cheaper as well as honester, to buy their Lands than to take them by Force.

Your State would, I imagine, be much more secure from the Mischiefs of Indian Wars, if you imitated the Mode of Settlement in the New England States, which was to grant their Lands in Townships of about 6 Mile square to 60 Families. These first chose a Spot for their Town, where they clear'd a Square of perhaps 20 Acres, round which they fix'd their Houses 15 on a Side all fronting inwards to the Square; so that they were all in sight of each other. In the middle of the Square they erected a House for publick Worship and a School, stockaded round as a Fort for the reception & Protection of their Women & Children in Case of Alarm. Behind each House was first a Garden Plot, then an Orchard, and then a Pasture for a Cow or two, & behind all outwards their Corn field. Thus situated one House could not be attacked without its being seen & giving alarm to the rest, who were ready to run to its Succour. This discourag'd such Attempts. Then they had the Advantage of giving Schooling to their Children, securing their Morals by the Influence of Religion, and improving each other by civil Society & Conversation. In our Way of sparse and remote Settlements, the People are without these Advantages, and we are in danger of bringing up a Sett of Savages of our own Colour. (Albert Henry Smythe, ed., *The Writings of Benjamin Franklin* [New York, 1905-7], IX: 626, 7.)

CALIFORNIA PREFABS, 1850

We collect information on early prefabricated buildings and would be glad to have data from our readers.

In the exciting days of the Gold Rush most of the world's port cities seemed to be building ready-made houses for shipment to California. The *Pennsylvania Inquirer* mentions two operations in this highly speculative field. On January 15, 1850, it noticed the "Graham House" on Kearney and Pacific Streets, San Francisco, nearly completed. This was a wooden building 62′ x 100′, four and a half stories high (bar room 45′ x 75′). The frame was sent out from Baltimore.

On the following February 16 a project on the Southwark waterfront of Philadelphia is described in the same newspaper:

California Houses.—We were shown, yesterday, a number of frames of houses, intended for California. They have been made by Mr. Charles M'Intire, at his establishment, George street, below Shippen, and are constructed of the best material, and made in an admirable manner. In size they are twenty by forty feet, and will be two, and two and a half stories high, with substantial iron roofs, Mr. McIntire has now about forty of these houses completed and they are being put together in George street, and on a lot north of the Swede's Church. They are then taken down and carefully fixed up, preparatory to shipment on board the ship Zenobia, barque Sarah Boyd, and other vessels.—Thus far, Mr. McI. has made about one hundred frames, and has contracts for others . . .

CONCRETE BLOCKS, HONOLULU, 1870's

The Kingdom of Hawaii was not annexed until 1898, but it had been under strong American influence for nearly a century before that. Honolulu Harbor was discovered at the end of the eighteenth century by an English ship and quite a town developed there while California was still part of Mexico and our Northwest Coast was held by Indians. By the 70's, American-style buildings had replaced the native-style grass houses in the center of the city and some interesting, if minor, chapters in architectural history were being written between the old waterfront and the mission church at Kawaiahao.

Among the remarkable features of Honolulu there remain three concrete block structures erected in the early 1870's. These were in their time some of the most notable in the city. We were surprised to find this type of masonry in use so early and report here some pertinent facts gleaned from newspapers of the time.

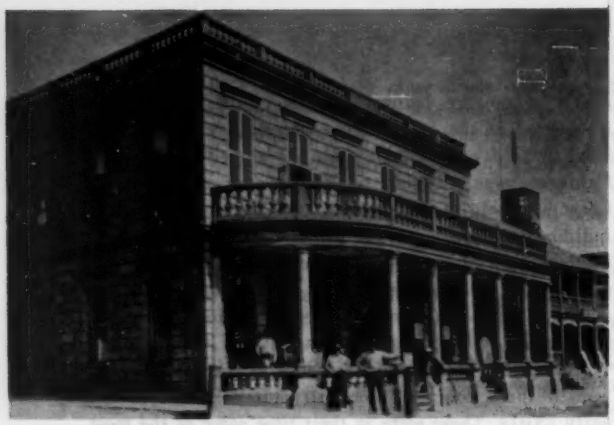
It should be explained that building materials have always been scarce in those islands. The only workable stone found generally is coral from the surrounding reefs and this is too coarse in texture to cut for decorative detail—especially the kind of detail popular with the Victorians.

Artificial stone, or cast concrete blocks, was tried with success. The first use in the Hawaiian Islands was to trim the corners of a stone sugar house at Waihee Plantation on the island of Maui in 1863 or 1864.[1] Concrete blocks were used again in the same limited way for an addition to Castle & Cooke's Honolulu store (1869) and one or two schoolhouses built by the Government.[2] Early in 1870 the English architect and builder J. G. Osborne,[3] who had handled the erection of the Castle & Cooke store the year before, introduced the novelty of whole walls of this material. The Honolulu Post Office, which is still standing at the corner of Merchant and Bethel Streets, has its four walls of concrete blocks. Today we know little about the project except that the blocks were cast on the site.[4] The Government's own paper, the *Hawaiian Gazette* said:

THE NEW POST OFFICE—Considerable interest is evinced by our citizens in the New Post Office, now being built of concrete by Mr. Osborne, which, although it has been used here in some instances to a limited extent in building, has never before been the sole material in the erection of a building. Any doubts which may exist as to its adaptability will be dispelled by an examination of the blocks and pillars already completed, as well as by reference to those experienced in the use of the same material in Europe and the United States . . .[5]

This two-story building of rusticated blocks was completed at a cost of eighteen thousand dollars.[6] According to the *Gazette* the community considered the building an ornament to the town and concrete to be "one of the very best materials for this climate."[7] Osborne also introduced concrete sidewalks here and concrete curb stones "hard as flint."[8] The Post Office was a civic lion for many years and its concrete walls are still in sound condition.

The building of the Hawaiian Hotel, downtown pre-



Honolulu Post Office Building, 1870. J. G. Osborne, architect. (Courtesy Peabody Museum of Salem)

Judiciary Hall (Aliiolani Hale), 1872. Thomas Rowe, architect. (Courtesy Bishop Museum)

Hawaiian Hotel, 1871. J. G. Osborne, architect.

Royal Tomb of Lunalilo, 1874 or 5. Robert Lishman, architect.

decessor of the present Royal Hawaiian at Waikiki, was the great government project of the following year. Osborne was again chosen as architect.[9] The type of construction was discussed by the Cabinet Council, which decided to follow His Majesty's preference for concrete.[10] Again, little is revealed about the actual process of building, except that one Captain Long was paid $1,344 for cement, that the "moulders work" was done by the firm of Lewers and Dickson[11] and that afterwards there were 217 "moulds for concrete stones" to be disposed of. We wish that there were some eye-witness accounts available.

The new building was 95′ x 120′ in size and three stories high.[12] The walls were built of rusticated blocks very similar to those of the Post Office. It was the most imposing hotel in the Pacific and was opened with a gas-lit ball in March of 1872.[13] Its cost was estimated to be $116,000.[14] No very adequate views of this famous building seem to have been made, and it was torn down many years ago.

Two prominent store buildings in downtown Honolulu also used concrete at this time—C. E. Williams' fireproof store on Fort Street (1871) had a concrete front and the Dillingham Store on King Street (1872) was also of this material.[15] The *Advertiser* declared the new material to be superior to brick and stone "in point of durability, cheapness and general appearance."[16]

Just as the Hawaiian Hotel was opening, the corner-stone was laid for a third major building of concrete blocks—the Judiciary Building or Aliiolani Hale on King Street.[17] The Australian architect, Thomas Rowe of Sydney, in forwarding the plans had recommended that it be built of stuccoed stone,[18] but concrete blocks again won the day. By the end of April, 1872 two thousand dollars had been spent on "moulds, working gear, & nearly all the blocks made for the lower of the two stories."[19]

Robert Lishman, an Englishman who had come to Honolulu to superintend the work on the Judiciary Building, was drawing plans in 1874 for a new royal Palace to be built in concrete.[20] While these were never executed (and seem to have been lost), Lishman did design a tomb for King Lunalilo about the same time. As the King neared the end of his brief reign he willed

that his remains be entombed in Kawaiahao churchyard rather than in the new Royal Mausoleum in the Nuuanu Valley. Conforming to his wishes, a pretty little Gothic tomb of concrete blocks was erected and is still to be seen.[21] The tomb was the last important building of its type; the Iolani Palace built five years later had only a few concrete blocks to trim its brick walls.

The continued excellent condition and appearance of these buildings has more than justified the use of the material. The imports of cement had increased from 155 barrels in 1864[22] to 4,799 barrels in 1872.[23] In that year it was declared before the Legislature that:

. . . if we went on in this way we would be like the Emperor who found Rome a city of brick and left it a city of marble, now perhaps it is the desire of the Ministry of Kamehameha V, who found Honolulu a city of wood, to leave it a city of concrete.[24]

But the vogue ended as abruptly as it had started. What caused the subsequent decline in the use of this material is not apparent; perhaps it was the departure of Architect Osborne from the local scene. The *Advertiser*, after listing its virtues had only one criticism: ". . . the principal objection to the using of concrete is the unconscionable length of time it takes to put up a building of that material."[25]

There is no cement rock in the Hawaiian Islands and no fuel to burn it with. All of this cement had to be imported. Contemporary advertisements give the source of supply in some cases, such as "White's Portland Cement, the Best English Cement" and "Benecia [California] Cement—much superior to Eastern and equal to the best Roman or Portland Cement."[26]

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Little seems to be known generally about the use of "artificial stone" in this period. The writer has noticed only one other example comparable to those in Honolulu. That is the Dwight Place Church erected in New Haven, Connecticut about 1872, David R. Brown, architect. It still stands in good condition.

San Francisco had some experience with this material. In 1868 the Pacific Stone and Concrete Company was organized "for the purpose of manufacturing stone under Professor Ransome's patent" which had been "used in Europe and in China with success" and also made in India, Austria, Belgium, Denmark and Sweden.[27] In 1872 a San Francisco manufacturer bought the rights to make "Frear Stone" from the Chicago patenter for $80,000 and concrete statuary was designed for the new California state capitol.[28]

We'd be glad to have some contributions from our readers on this subject.

1. *Pacific Commercial Advertiser (PCA)*, March 25, 1871.
2. *Hawaiian Gazette (HG)*, November 24, 1869 and May 8, 1872.
3. Osborne was a Yorkshireman experienced in brickmaking. He had appeared in the Islands by 1866 and advertised himself as a "Mason, Builder and Contractor." *HG*, March 10, 1866, *Daily Hawaiian Herald*, September 29, 1866.
4. *PCA*, February 26, 1870.
5. *HG*, March 2, 1870.
6. *Ibid.*, July 3, 1872. This was triple the original estimate.
7. *Ibid.*, March 22, 1871.
8. *PCA*, February 18, May 13, 1871.
9. *HG*, May 17, 1871.
10. Archives of Hawaii (AH), *Cabinet Council Minute Book, (MS)* January 10, March 20, 1871.
11. AH, *Interior Department File Hawaiian Hotel (MS).*
12. *HG*, May 17, 1871.
13. *Ibid.*, March 6, 1872.
14. *Hawaiian Almanac and Annual for 1875*, 43. This was nearly double the original estimate. *HG*, July 3, 1872.
15. *HG*, October 4, 1871, May 8, July 17, 1872.
16. *PCA*, May 13, 1871.
17. *HG*, February 14, 21, 1872.
18. AH, *Palace File*, description of plans by Thomas Rowe, 1871.
19. Appendix to the Report of the Minister of Finance from the Interior Department, 1872, p. 3. The concrete blocks of a portion of a rear wing could still be seen in 1946 in the rear of the present YMCA building.
20. AH, *Cabinet Council Minute Book*, April 17, 1874.
21. The date of erection seems to have been 1875. *PCA*, July 10, 1875.
22. *PCA*, March 18, 1865.
23. *Ibid.*, February 12, 1873.
24. *HG*, July 3, 1872.
25. *Supra.*
26. *PCA*, July 8, 1882 and *HG*, June 17, 1865.
27. *Daily Morning Call* (San Francisco), Sept. 4, 1868. *Scientific Press* (San Francisco), Sept. 24, 1870.
28. *Daily Evening Post* (San Francisco), July 13, Sept. 5, 1872.

PERRET BIBLIOGRAPHY

Speaking of concrete as more recently developed, the American Institute of Architects has published a 17-page mimeographed bibliography compiled by Librarian George Pettingill on Auguste Perret, the French architect who has just been awarded the A.I.A. Gold Medal. "The references have been arranged in broad groups as follows: Writings of M. Perret; Book references; Biography and Criticism; Honors; Reinforced concrete; Miscellany; Major works individually by date; Other buildings; Projects." Institute members will be furnished free copies on request to the Octagon (1741 New York Avenue, N.W., Washington 6, D. C.). For others, the price is $1.00.

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Also procurable from the Octagon are the newly reprinted papers on "The Effect of Steel and Glass upon Architectural Design" first read before the 1896 convention of the Institute. The 24-page pamphlet makes available the evaluations of Joseph Warren Yost (Columbus, Ohio), Dankmar Adler (Chicago), R. D. Andrews and G. F. Newton (both of Boston) on what are still considered modern materials. Postpaid, $.55 each.

Palace of Fine Arts, San Francisco, 1915. Design and rendering by Bernard Maybeck.

Henry-Russell Hitchcock recently made a cross-country trip looking at the nation's buildings, old and new. We asked him what was the most surprising thing he ran into this time and he said it was the widespread interest and appreciation in the West of Bernard Maybeck's work. Our old colleague, Frederick D. Nichols, returning to the continent from three and one-half years on the faculty of the new architectural department of the University of Hawaii, made us a few notes after talking with Mr. Maybeck and we are glad to pass them along herewith.

For the uninitiated Mr. Nichols writes that Bernard Maybeck was born in New York City, February 7, 1862, and, after attending public and private schools in this country, he was sent to Paris, where he entered the atelier of M. André at the École des Beaux Arts. When he returned to America he worked for Carrère and Hastings in New York and H. Page-Brown in San Francisco. In 1894 he was appointed an instructor in drawing and architecture at the University of California; he was the originator of the Phoebe A. Hearst competition for the design of the University of California in 1896; and in 1899 he founded the department of architecture there. In 1923 he was given an honorary M.A. by Mills College and in 1930 the University of California gave him an LL.D. He was appointed supervising architect with the United States Shipping Board in 1918 for the town of Clyde, and he was a member of the Berkeley City Planning Commission. In 1951 he received the Gold Medal of the American Institute of Architects.

A VISIT WITH BERNARD MAYBECK

We walked down a winding road until we came to a small house set in the woods. There, with his back to us, sitting on a chaise lounge, was a man in a rose-colored cap. Without turning, he greeted us by motioning with his hands for us to come to his terrace. Bernard Maybeck, in faded denim (and the cap that turned out to be a hand-knitted tam-o'-shanter) was speaking.

As he talked, we had time to study his face with its keen, dark eyes and long, greyish beard. His legs were covered with a blanket, but his feet were bare and browned and exposed to the sun. From the Berkeley hillside where we sat, there was a broad view through the trees of the Bay, with San Francisco in the distance. We had just stopped to see one of his recent houses. A simple affair in cement block with a roof supported by a plain Tudor-arch sort of truss, it was embellished with a magnificent concrete fireplace. The scale was small and the materials were inexpensive, but the house was a minor masterpiece. He was interested to hear that I had come from Hawaii (or the Sandwich Islands as he preferred to say), and started off by saying that climate, which is all important to architecture, had been ignored there when he first visited it. At one of the big Waikiki hotels he had been unable to sleep because of the one window in his room which provided inadequate ventilation. He spoke of Mrs. Farrington's house with its *lanai* or porch, protected only by adjustable blinds which could be lowered in inclement weather. Such openness he thought was the key to design in the tropics.

But climate and its constant consideration were always the first study of the architect. In the old days when he was with Carrère and Hastings, the office functioned in this manner: (I quote from a letter of A. W. Maybeck) "Hastings made the preliminary drawings and explained the scheme. These drawings were given to the draughtsmen to draw up, putting the practical work on paper. Then Hastings or Maybeck 'studied' proportions, etc. The drawings were corrected accordingly and turned over to the main office for engineering, electrical, and

plumbing drawings. Then the whole thing went to Carrère. . ." So it was with the Ponce de Leon hotel in St. Augustine, which he worked on circa 1885 (and with which he was particularly pleased for he mentioned it several times), and the Crocker building (1889-1890)[1] in San Francisco. Then we discussed the Packard showrooms for Earl C. Anthony, and the great house which he built for him in Los Angeles. This house, which cost $500,000, was designed and built by Maybeck in 1928-1930,[1] but it seems that the showrooms had been built by contractors and the architect had been called in afterwards to give some distinction to the buildings. The most famous of these, the San Francisco building on Van Ness Avenue, was built circa 1926 and the others, in Oakland and Los Angeles, about two years later. The exterior of the former is embellished with great red marble Roman Corinthian columns and black terra-cotta. Inside, it is enriched with splendid marble columns, a green tile floor and a massive wooden ceiling.

"You may think I'm rambling," he said once, "But I'll tell you some stories, and these have a point." It was true, indeed, that no matter what he spoke about, his stories ended up by having some relevance to architectural design. One of these little stories concerned his early days in Paris. When he began his studies at the École des Beaux Arts in the atelier of M. André about 1881, he had made a beautiful, neat, accurate drawing on clean Whatman paper. "Père" André said, "Beautiful. Now study it." Maybeck was stupefied, and he asked another student named Ristori what "Study" meant. Père André took a soft dark pencil and messed the beautiful drawing, drew here and there, erased and re-erased. All the while Maybeck watched a beautiful finished drawing emerge. Thenceforward Bernard Maybeck "studied."

Suddenly it was four o'clock and time to listen to the news. We went inside and he motioned us to seats while he sat in a camp chair directly in front of a little radio. While he listened, I had time to look about. The room was an excellent prototype of the wooden houses of a later generation which would become famous as examples of the "Bay Region Style." The room was of the simplest redwood construction with an exposed timber ceiling, and it opened with a series of big windows to a splendid view of the Bay through the eucalyptus trees. There was a romantic touch to this room which is characteristic of all his work.

In fifteen minutes the program ended and we stood up to return to our chairs on the terrace. I could not help noticing a photostat of a handsome charcoal drawing of the famous Palace of Fine Arts at the Presidio, a relic of the 1915 San Francisco Exposition. I admired it.

"Ah, yes," he said. "How important spirit is in architecture. There were many drawings and some fine designs, but when Henry Bacon saw this charcoal rendering, he was immediately impressed. So I received the commission, because the drawing reflected the spirit of the building. That is the essence of architecture, gentlemen: Spirit."

Frederick D. Nichols, Charlottesville

[1](Note: The dates are from a letter of A. W. Maybeck's, dated February 11, 1952 in the possession of the writer. F.D.N.)

WHAT HAVE YOU PUBLISHED?

We feel that one of the greatest needs of workers in the history of American architecture is a current bibliography. Much has been published in the field since the Roos bibliography of 1943 that does not appear in the *Art Index.*

Miss Ruth V. Cook, SAH member and Librarian of the Department of Architecture, Harvard University, Cambridge 38, Massachusetts, has most kindly offered to keep an open bibliography of writings published by members of SAH and already has compiled a formidable list for the period 1950-51. Miss Cook, however, has no way of locating all the articles that appear in local periodicals, such as historical quarterlies.

Will each member please send Miss Cook a complete citation of his published works since 1950. We are hoping to find some funds for publishing the results. Our income from memberships is not large enough to allow us to print it in the *Journal* itself.

SAH NEWS

TOUR OF EASTERN LONG ISLAND

An itinerary of the SAH summer tour has been sent by Dan Hopping, who was in charge. About forty people attended and all reports deem it a success. It lasted from Saturday noon until Sunday evening, August 16th-17th, and covered the towns of East Hampton, Wainscott, Sag Harbor, Shelter Island, Cutchogue and Setauket, and points between. The majority of the houses seen were of the 18th century, although scope was also provided from the Horton house of 1649 in Cutchogue to the late 19th-century summer home of Horace Taft at Wainscott. One is struck by the amount of restoration and preservation activity in this area. The Whalers' Church and the Huntting house in Sag Harbor were visited. They were designed by Minard Lafever and were illustrated in Professor Hamlin's article in the May issue of the *Journal.* Mr. and Mrs. Morris Ketchum, Miss Mary Willis, the East Hampton Library, the Old Sagg Harbour

Committee and the Society for the Preservation of Long Island Antiquities contributed in various ways toward making the trip pleasant and informative.

CHICAGO PROJECT SUSPENDS

The Bulletin of the Chicago Chapter of the American Institute of Architects, from which we have drawn a good deal of interesting intelligence in the past, contains disturbing news in the September number. The University of Illinois Research Board has withdrawn its support from the architectural microfilm project which it has been carrying on with the Burnham Library over the past two years (See American Notes, March, '52). The reason given by President Stoddard of the University of Illinois was that although the Research Board was willing to start such projects it could not keep them going indefinitely. The Burnham Library is going to remain as the depository for such material, however, and a $500 grant recently made by the American Architectural Foundation will sustain a minimum of activity until such time as a new amount can be raised. Anyone wishing to assist in the revival of this valuable project should write to Mr. Earl H. Reed, Chairman of the Advisory Committee, Route 1, Box 51, Chesterton, Indiana, or directly to the Burnham Library at the Art Institute of Chicago.

SAH TAX EXEMPTION GRANTED

Secretary John Forbes has recently forwarded the welcome news that the Treasury Department has granted the Society of Architectural Historians official tax exemption status under the provisions of Section 23 (o) and (q) of the Code. Clarification of this issue was sought because of the initiation of a corporate membership of $250 this year. The American Architectural Foundation, Inc., is our original corporate member and its name is listed inside the cover for the first time this month.

LECTURES OFFERED

Marcus Whiffen, M.A. (Cantab.) and lately Assistant Editor of the *Architectural Review*, has arrived in this country to take up a temporary teaching post in architectural history at M.I.T. While here he is interested in travelling and is offering three lantern slide lectures: "Georgian Church Architecture in England, Gothic Survival and Gothic Revival in English Architecture 1580-1830, and Garden into Landscape and Landscape into Garden: a Survey of the English Country House Setting through Two Centuries." Mr. Whiffen has written three books covering this general area of history. His address will be: Massachusetts Institute of Technology School of Architecture, 77 Massachusetts Avenue, Cambridge 39, Massachusetts.